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DENTAL PATHOLOGY
AND
THERAPEUTICS.

J. FOSTER FLAGG, D. D. S.

OTTO E. INGLIS, D. D. S.

RK 57

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DENTAL PATHOLOGY

AND

THERAPEUTICS

IN THE FORM OF

QUESTIONS AND ANSWERS

COMPILED BY

OTTO E. INGLIS, D. D. S.

CAREFULLY REVISED AND APPROVED

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PHILADELPHIA

1887

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MEDICAMENTS.

Arranged in alphabetical order.

DENTAL PATHOLOGY

AND

THERAPEUTICS.

GENERAL PRINCIPLES.

1. *Question.*—What is that force called upon which depends all response to remedial efforts?

Answer.—*Vis Vitæ* (life force).

2. What is this force called as a conservator?

Vis Conservatrix Naturæ.

3. What as a medicator?

Vis Medicatrix Naturæ.

4. What is the employment of indicated means for relief called?

Ars Medendi.

5. What is the theory of relief called?

Ratio Medendi.

6. What are the meanings and uses of the prefixes “hyper,” “hypo,” “a” or “an,” “epi,” and the suffixes “itis” and “algia?”

“Hyper,” above, excessive; “hypo,” under, beneath, deficiency; “a” or “an,” without, lacking; “epi,” upon, on; “itis,” inflammation; “algia,” pain.

7. Define the “Principles and Practice of Dentistry.”

Such application of general facts as is subservient to the requirements of dentistry.

8. What is “Dental Pathology and Therapeutics?”

Dental pathology considers the causes and different forms of the various diseases to which the teeth are liable; dental

therapeutics considers the methods and medicaments used in the treatment of such diseases.

9. Define the terms "Disease," "Etiology," "Semiology" and "Nosology."

"Disease," alteration of nutrition; "etiology," causes of disease; "semiology," the symptoms and signs of disease; "nosology," the classification of diseases.

10. Define the terms "Diagnosis" and "Prognosis."

"Diagnosis," distinction of disease; "prognosis," the foretelling of the probable and possible progress and termination of disease.

11. What are signs? What are symptoms?

Signs are indications which can be *seen*; symptoms are feelings as *described* by patients.

12. What is the *first* natural division of essential precedents to disease?

"Intrinsic" and "Extrinsic."

13. What is the meaning of these terms?

"Intrinsic," excess or deficiency of functional action or of some constituent of the economy; "extrinsic," external agencies which have power to act on either mind or body.

14. What is the *second* natural division of these causes?

"Predisposing" and "Exciting."

15. What are predisposing causes?

Circumstances which influence function or structure unfavorably, yet short of actual disease.

16. What are exciting causes?

Causes which of themselves induce disease, or which promote the resulting effect of the predisposing cause.

17. Are the predisposing and exciting causes both necessary for disease?

As a rule they are.

18. Name an example where both are not necessary.

A splinter in the flesh is an exciting cause only.

19. Are these causes susceptible of transposition?

Yes; an exciting cause may be at times a predisposing cause, and *vice versa*.

20. Give an example.

Debilitating exposure to cold may predispose to diarrhoea from indigestible ingesta. Transposition—One predisposed

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through irritability of the intestines will incur diarrhœa by exposure to cold.

21. Name the predisposing causes of disease, according to Williams.

- | | |
|-----------------------------|-----------------|
| 1. Debilitating influences. | 6. Temperament. |
| 2. Excitement. | 7. Age. |
| 3. Previous disease. | 8. Sex. |
| 4. Present disease. | 9. Occupation. |
| 5. Hereditary constitution. | |

22. Into what two classes are the exciting causes of disease divided?

“Cognizable” and “Non-cognizable.”

23. Name some of each, according to Williams.

- | | | |
|-----------------------|---|---|
| COGNIZABLE
CAUSES. | { | 1. Mechanical. |
| | | 2. Chemical. |
| | | 3. Ingesta. |
| | | 4. Bodily exertion. |
| | | 5. Mental emotion. |
| | | 6. Excessive evacuation. |
| | | 7. Suppressed or defective evacuation. |
| | | 8. Defective cleanliness, ventilation and drainage. |
| | | 9. Temperature and changes. |

- | | | | |
|---------------------------|---|----------------|------------|
| NON-COGNIZABLE
CAUSES. | { | 1. Endemic. | } Poisons. |
| | | 2. Epidemic. | |
| | | 3. Infectious. | |

24. What are the “elements” of disease?

Functional, structural, circulatory and nutrient departures from normality.

25. What is the division of the “elements” of disease?

Into “Primary” and “Proximate.”

26. Name the primary elements of disease.

- | | | |
|--------------------|--|---|
| <i>Structural.</i> | <i>Functional.</i> | |
| CONTRACTILE FIBRE, | { Irritability.
Tonicity. | } Excessive.
Defective.
Abnormal. |
| NERVOUS STRUCTURE, | { Sensibility.
Voluntary motion.
Reflex action.
Sympathy. | |
| SECRETORY TISSUE, | Secretion. | |

27. Name the proximate elements of disease.*

BLOOD IN CIRCULATION.	Defective, "Anæmia."	{ General. Local.	{ Circulation. <div> Increased, "Sthenic." Diminished, "Asthenic." </div>
	Excessive, "Plethora."	{ General. Local.	{ Circulation. <div> Increased, "Determination." Diminished, "Congestion." Partly increased and partly diminished, "Inflammation." Terminations of In- flammation: <div> "Resolution," "Suppuration," "Gangrene," "Mortification," "Sloughing," (?) † </div> </div>
NUTRITION OF TISSUES.	Perverted, "Cachæmia."		{ Of soft parts.
	Defective, "Atrophy."		{ Of hard parts.
	Excessive, "Hypertrophy."		
	Perverted.		{ Degenerations. Depositions. Growths.

28. What is the difference between a primary and a proximate element of disease?

The former considers the pathological condition of a certain function or structure; the latter considers the diseases of the circulation and the consequent effects upon tissue.

29. Into what classes are special medicinal stimuli generally divided?

"Cathartics," "Diuretics," "Diaphoretics" and "Sudorifics," "Expectorants," "Sorbefacients," "Emmenagogues," "Sialagogues," "Errhines."

30. What are "cathartics"?

Medicines which increase the alvine discharges.

* *Williams' Principles of Medicine*—Clymer, pp. 92 and 93.

† Questionable terminations dependent upon systemic power or necessary interference.

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31. How are they divided?

Into "Laxatives" or "Aperients," and "Purgatives," according as they act mildly or decidedly.

32. What peculiarity of action pertains to these?

Some act upon the superior portion of the intestines (example—calomel); some upon the inferior portion (example—aloes); others upon the whole extent of intestines (example—sulphate of magnesia).

33. What are "diuretics"?

Medicines which increase the secretion of the urine.

34. What are "diaphoretics"?

Medicines which increase perspiration.

35. What are "sudorifics"?

Medicines which induce copious perspiration.

36. What are "expectorants"?

Medicines which excite secretory action in the air-passages.

37. What are "emmenagogues"?

Medicines which are regarded as having the power of inducing or increasing the menstrual discharges.

38. What are "sialagogues"?

Medicines which induce an increased flow of saliva.

39. What are "errhines"?

Medicines which induce increased nasal discharges.

40. What is a "seton"?

A strip of linen, or piece of thread, which, by means of a seton-needle, is passed through a fold of the skin and allowed to remain. By occasional moving of this, counter-irritation is maintained.

41. What are "epispastics"?

Applications to the exterior of the body which produce redness, usually pain, and an effusion of serum, thus separating the epiderm from the "cutis vera" and presenting what is called a "raw surface" (commonly called "blisters").

42. What are "alteratives"?

Medicines which are accredited with effecting a change for the better through the general function of nutrition.

43. How is blood obtained, and how is it replenished?

Obtained through digestion and assimilation; replenished by food.

44. What is the "pulse?" At what points is it taken?

Pulse is the effect of the heart-beat upon the blood in the arteries. Usually taken at the radial, brachial, temporal, carotid or femoral artery, or from over the heart itself.

45. Name the varieties of pulse and their opposites.

"Frequent and slow" (refer to the number of pulsations in a minute); "hard and soft" (refer to compressibility—hardness indicates general strength; softness indicates prostration); "quick and sluggish" (quickness indicates slight irritability and debility; sluggishness indicates exhausted irritability and debility); "full and small" (refer to volume of pulsation; unreliable except when taken into consideration with other kinds of pulse); "strong and weak" (strength is a general indication of health; weakness, of an opposite condition); "regular and irregular" (belong to nervous disorders or idiosyncrasies).

46. Give the normal frequency of the pulse from foetal life to old age.

Foetal heart,	140 beats per minute.
At birth,	130 " " "
First year,	110 " " "
Second year,	100 " " "
Fifth year,	90 " " "
Tenth year,	85 " " "
Puberty,	80 " " "
Adult,	75 " " "
Old age,	80 " " "

47. What are the ordinarily classified constituents of the blood—the relative proportions in normal blood?

Red and white corpuscles,	140 parts.
Fibrin,	3 "
Albumen,	70 "
Fatty matters,	4 "
Salts,	6 "
Water,	777 "
Total,	1000 "

48. What is the division of the blood in circulation?

Red and white corpuscles and liquor sanguinis.

49. What is the division of drawn blood?

"Clot" and serum.

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50. What is the "clot?"

The red and white corpuscles suspended in meshes of fibrin.

51. What is serum?

The albumen, salts and fatty matters of the blood held in solution by the water.

52. What is the first act of vitality in connection with the blood?

Coagulation.

53. What is the last act?

Coagulation.

54. What constituent of the blood seems nearest allied to coagulation?

Fibrin.

55. What are the three great peculiarities of clot?

1st, uniform coagulation with little contraction (showing healthy clot); 2d, uniform coagulation with marked contraction and plainly "cupped" (indicative of anæmia); 3d, tough, contracted and concaved, with "buffy coat" (occurring in general inflammatory conditions).

56. What is meant by the "buffy coat?"

The peculiar buff-colored film upon the surface of the "inflammatory clot."

57. What is meant by "Anæmia;" "Spanæmia;" "Hyperæmia;" "Plethora?"

Deficiency of red corpuscles; poor blood; abundance of red corpuscles; fullness of blood-vessels.

58. How is anæmia divided?

Into "Acute" and "Chronic."

59. What is the cause of acute anæmia?

Direct loss of blood by hemorrhage.

60. What are the symptoms in their order of severity?

Pallor; coldness; weak, small pulse; muscular debility; gasping; faintness; complete syncope; death.

61. What is its treatment?

Remove cause by stopping hemorrhage; stimulate respiration by ammonia or electricity; administer tonics to give strength, and food to replenish blood; give perfect rest.

62. How is electricity applied in this case?

Place the "positive" pole at the nape of the neck, the "negative" at the ensiform cartilage; intermit twelve or fifteen times a minute.

63. What is the cause of chronic anæmia?

Loss in quantity or quality of blood, due to long-continued influences.

64. What is the treatment for chronic anæmia?

The continued administration of phosphatic and chalybeate tonics and bitters (gentian, quassia, etc.), moderate exercise, journeying, and a judicious employment of time as to occupation, enjoyment, feeding and sleeping.

65. How is plethora first divided?

"Sthenic" and "Asthenic."

66. What is meant by sthenic plethora?

Excess of blood, with increased irritability and tonicity, combined with a tendency towards fevers and local inflammations.

67. What is meant by asthenic plethora?

Excess of blood, with want of irritability and tonicity, combined with a tendency towards systemic depression.

68. What is the treatment for sthenic plethora?

Blood-letting, actual and medicinal sedation, light and limited diet, and decided exertion.

69. What is the treatment of asthenic plethora?

Tonic medication, moderate drastic purgation, strengthening and nourishing diet, and regulated moderate exercise.

70. How is plethora secondarily divided?

General and local.

71. What is local plethora?

Excess of blood in a part.

72. How is local plethora divided?

"Determination," "Congestion," "Inflammation."

73. What is the location and peculiarity of "determination?"

Location—In the arteries and arterial capillaries. Peculiarity—Excess of blood, with motion increased.

74. What is its exciting cause?

Irritation or stimulation.

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75. What are its symptoms and effects?

Increased sensation and nutrition (hypertrophy).

76. What are the four means for treatment?

"Depletion," "Derivation," "Relaxation," "Sedation."

77. What are the meanings of these terms?

"Depletion," actual blood-letting; "derivation," a draining away of the blood to a distant part by derivatives; "relaxation," slight general or systemic weakening, as by small doses of narcotics; "sedation," actual local or systemic depression by sedatives.

78. What is the location and peculiarity of "congestion?"

Location—Veins and venous capillaries. Peculiarity—Excess of blood, with motion diminished.

79. What are its symptoms and effects?

Blueness; purplish color; diminished warmth and sensibility; followed by numbness, coldness and painful distention in the part; cessation of functional action; transudations.

80. What are its four means for treatment?

Mechanical (pressure and support); astringents or stimulants; depletives; rubefacients or sorbefacients.

81. What are the locations and peculiarities of "true inflammation?"

Location—Arteries, capillaries and veins. Peculiarity—Excess of blood, with motion partly increased and partly diminished.

82. What are its signs and symptom?

Signs—Redness, heat (?) and swelling. Symptom—Pain.

83. Describe the relative changes of white and red corpuscles which are apparent, microscopically, in inflammation.

White corpuscles increase in number and begin to adhere to the walls of the vessels and amass in the capillaries, thus arresting the progress of the red disks. Some of the white globules work through the walls of the vessels, and are called exudation corpuscles. When one of these dies it becomes a pus corpuscle.

84. Into what two classes is inflammation divided?

"Sthenic," "Circumscribed" or "Phlegmonous," and "Asthenic," "Diffused" or "Erysipelatous."

85. What are the three varieties of duration?

"Acute," "Subacute" and "Chronic."

86. What is the difference between the "general" and "dental" acceptance of these terms?

General—Acute, three weeks. Subacute, between three and six weeks. Chronic, more than six weeks.

Dental—Acute, three to four days. Subacute, four to seven days. Chronic, more than one week.

87. What are the two classes of irritants, or exciting causes?

"Local or Direct;" "General or Indirect."

88. What are the three divisions of the "local or direct" irritants, or exciting causes? Their meanings?

"Mechanical" (such as blows and splinters); "Chemical" (such as acids and escharotics); "Vital" (such as virus, malarial poison and arsenic).

89. What is the distinctive difference between them?

Mechanical and chemical irritants wound or destroy both living and dead tissues; vital irritants act on living tissues only. (See Arsenic.)

90. What is meant by "reaction?"

The recuperative act of vitality which follows depression.

91. What are the results of congestion and inflammation?

Effusions.

92. What is the difference between congestive and inflammatory effusions?

Congestive effusions are non-organizable; inflammatory effusions are organizable in degree.

93. What are the varieties of inflammatory effusions?

Euplastic, or highly organizable (cicatricial or reparative tissue); Cacoplastic, or less organizable (indurations, etc.); Aplastic, or non-organizable (curdy, yellow tubercles, etc.).

94. What are the *terminations* of inflammation?

Resolution or Suppuration.

95. What is meant by resolution?

Subsidence of inflammation, more or less absorption of effusions, and return to comparative normality.

96. What is the treatment to endeavor to effect resolution?

The use of such "antiphlogistics" as "stimulants," "sedatives," "evacuants," "sorbefacients," "pressure," "friction," etc.

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97. What is meant by suppuration?

The breaking down of circumvallated tissues, which, with "white" and "tissue" corpuscles, forms pus.

98. What is the treatment to effect this?

Stimulation.

99. What is the difference in degree between stimulation to effect resolution and stimulation to effect suppuration?

To effect resolution, stimulate in moderation (as can be comfortably endured); for suppuration, stimulate decidedly (all that can be endured).

100. What is the present theory of pus corpuscles?

They are the devitalized "white corpuscles" and "tissue corpuscles." (See 83.)

101. What is meant by the "pyogenic membrane?"

The dividing line between living tissue and pus.

102. Is this line truly a membrane?

No.

103. What are the symptoms of suppuration?

Diminution of heat, pain, irritation and vascular excitement; swelling becomes softened, with *fluctuation* upon tapping; redness replaced by yellowish or mottled color.

104. What is an "abscess?" What is a "fistula?"

A circumscribed cavity containing pus. A tract leading to an abscess.

105. What is "pointing?" What is an "ulcer?"

The tendency of pus to the surface, usually indicated by a pale spot. A pus-discharging opening.

106. What is meant by "Gangrene," "Mortification," "Sloughing," "Caries," "Necrosis," "Sequestrum," "Exfoliation?"

"Gangrene," incipient mortification; "Mortification," death and decomposition of the soft parts before sloughing; "Sloughing," the natural separation and throwing off of soft parts; "Caries," ulceration of bone; "Necrosis," death of bone; "Sequestrum," dead bone; "Exfoliation," the throwing off of dead bone; also applied to the "elongation" of the teeth.

107. What is the systemic effect of extensive suppuration?

Diminution of fever; frequent, weak pulse; chills and sweats, with flashes of heat; weakness; exhaustion and possibly death.

108. What is meant by the term "adynamic?"

Debilitated vitality.

DECIDUOUS TEETH.

109. How is a tooth anatomically divided?

Crown (that normally outside the gum); neck (that at the free edge of the gum); root or roots (that imbedded in the process); its end is called the apex.

110. How is a tooth physiologically divided?

Enamel, dentine, pulp and cementum.

111. What is the first grand division of all teeth?

Upper and lower.

112. Name the faces of the teeth.

Mesial, . . . toward the central line.

Distal, . . . away from the central line.

Labial, . . . toward the lips, from cuspid to cuspid inclusive.

Buccal, . . . toward cheek, from first bicuspid to wisdom.

Palatal superior jaw, } toward the hard palate or tongue.

Lingual inferior jaw, }

Cutting edge, . . . pertaining to incisors.

Cusp, . . . " " cuspids.

Articulating, . . . " " bicuspids and molars.

113. What are the various functions of the dental pulp?

A means of nutrient supply, sensation, preservation of translucency and vital resistance.

114. What is the pericementum?

A vascular membrane between the cementum and the walls of the alveolus. It nourishes the cementum.

115. What is the order of eruption of the "deciduous" teeth?

CENTRAL INCISORS,	{ lower, 5 to 7 months.
	{ upper, 7 " 8 "
LATERAL INCISORS,	{ lower, 8 " 9 "
	{ upper, 9 " 10 "
FIRST MOLARS,	{ lower, 11 " 12 "
	{ upper, 13 " 14 "
CANINES OR CUSPID,	{ lower, 17 " 18 "
	{ upper, 19 " 20 "
SECOND MOLARS,	23 " 30 "

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116. What are some of the exceptions to the general rule?

Some are born with a few teeth erupted. The lateral incisors vary as to period of eruption. Occasionally adults are edentulous from birth.

117. To what phase of dentition is infantile mortality largely due?

Pathological dentition.

118. What are the three divisions of pathological dentition?

1st, *moderate in severity*, showing *local* signs and first six *general* symptoms; 2d, *decided in severity*, showing in addition the next four *general* symptoms; 3d, *dangerous in severity*, having in addition the three final symptoms—congestion of brain, convulsions and emaciation.

119. Where is the finger to be introduced in the mouth of an infant less than ten months old?

In the corner of the mouth, to avoid giving pain, no teeth being in process of eruption there.

120. Where, if more than ten months old?

At the front of the mouth, the incisors having erupted and the first molars being in process of eruption.

121. What are the *general* symptoms of pathological dentition?

Loss of appetite, peevish fretfulness, tossing restlessness, actual wakefulness, feverish thirst, painful paroxysms, continuous suffering, bowels loose or constipated, exhaustion, tendency toward congestion of brain, congestion of brain, convulsions and emaciation.

122. How may pathological dentition, dangerous in severity, terminate?

It may even terminate in death.

123. What are the usual *local* signs of abnormal dentition?

Redness and swelling; followed by whiteness of gums; decided flow of saliva ("drooling"); desire to suck thumb or fingers; biting the ring or spoon with determination; alternately taking and refusing the breast; desiring upright position (to counteract flow of blood).

124. What are the exceptions to this?

When some or all of these signs are absent.

125. What is the first local remedy for pathological dentition?
Lancing.

126. What is the relative resistance between normal and cicatricial tissue?

Cicatricial tissue is the weaker, because of its secondary formation.

127. What is the best instrument with which to perform the operation of lancing?

A narrow-bladed, curved bistoury, wrapped with muslin, leaving exposed a quarter of an inch of the point.

128. How are the lower incisors to be lanced?

Parallel with and inside the cutting edges of the teeth.

129. How are the upper incisors to be lanced?

Parallel with and outside the cutting edges of the teeth.

130. Why this precaution to lance outside or inside of the incisor teeth?

In order that the lower teeth shall erupt so as to occlude inside the upper.

131. How are lower first, lower second and upper second molars to be lanced?

Crucially, with the X-incision from the disto-lingual cusp to the mesio-buccal cusp, and from the disto-buccal cusp to the mesio-lingual cusp.

132. How are upper first molars to be lanced? Why?

Crucially, with the plus (+) incision from the lingual to the buccal aspect, and from the distal to the mesial. Because the cuts then incise the gum over the *cusps*.

133. How are cuspids to be lanced?

Similar to incisors at first.

134. What is the treatment in pathological dentition after the cusps of cuspids are erupted?

Cut the ring of gum at two or four points.

135. What is the most thorough method of lancing molars in extreme cases?

Taking off a block of gum.

136. In performing this operation, what instruments are necessary?

Bistoury, tenaculum and decidedly-curved scissors.

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137. Which cuts should be made first? Which afterwards?

First the lingual cut, disto-mesially; afterwards the buccal cut; then the mesial cross cut. Piercing the gum block with tenaculum from beneath up, the distal cross cut should be made with scissors.

138. What are the immediate dangers from lancing?

Injuring the enamel; cutting the lips, gums, cheek or tongue, either from slipping of the instrument or sudden movement of the child.

139. How are these to be guarded against?

Wrapping blade of bistoury with muslin (see 127); properly finger-guarding the surroundings; properly securing child; care in lancing; anticipating sudden starts.

140. What is the method of securing child?

For lower teeth have infant's head lying, face upward, on assistant's left thigh (operator also sitting); child's hands crossed and held on abdomen by right hand; legs held by right arm; head held and eyes covered by left hand. For upper teeth reverse head to right thigh.

141. How should the child be placed as to light?

For upper jaw, feet towards light; for lower jaw, head towards light.

142. What is the subsequent danger from lancing?

Hemorrhage.

143. Which is the most dangerous form of hemorrhage?

Slow, oozing, atonic hemorrhage.

144. How is this dangerous?

Through the blood being swallowed, thus remaining unnoticed.

145. How is hemorrhage controlled?

By giving the breast or ring; by applying accurate local medication, as dental iodine, alcohol, tincture of chenopodium album or erigeron canadensis, or other styptics; giving the chenopodium or erigeron internally (see medicaments); placing patient in erect position; hot water to feet.

146. What periods of babyhood is the most fraught with danger from difficult dentition? Why?

The second summer. Because then winter-born children cut their cuspids and summer-born children their second molars. The hot weather aggravates the pain of eruption.

147. What are the indications for extraction of the deciduous teeth?

When the inferior permanent oral teeth present outside the arch; when the superior permanent oral teeth erupt inside the arch and behind the deciduous; and when, in conjunction with frail and weakened constitutions, complications are liable to arise from necrosed and exfoliating deciduous teeth. As a rule, it is better that deciduous teeth should remain until the proper absorption of their roots is indicated by loosened crowns.

148. If deciduous molars are extracted between the ages of five and seven years, what injury may be inflicted?

The developing bicuspid may be injured mechanically, inasmuch as the roots of the deciduous molars are but partially absorbed and envelop approximately the developing crowns of the bicuspid.

PERMANENT TEETH.

149. What is the order of eruption of the permanent teeth?

First molars,	from 5½ to 7 years.
Central incisors,	" 6 " 8 "
Lateral incisors,	" 7 " 9 "
First bicuspid,	" 9 " 10 "
Second bicuspid,	" 10 " 11 "
Lower canines,	" 10 " 12 "
Second molars,	" 12 " 14 "
Upper canines,	" 13 " 15 "
Wisdom,	" 17 " 45 "

Lower teeth, as a rule, precede the upper by a few months.

150. What is the peculiarity of pathological eruption of upper wisdom teeth? Its remedy?

Presenting buccally and growing into the cheek. Remedy—Grinding off cusps or extraction.

151. Which are generally the most difficult of the permanent teeth in pathological eruption?

Lower wisdom teeth.

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152. What are the symptoms, in their order of severity, of pathological eruption of the lower wisdom teeth?

Absence of wisdom tooth; long before ready for lancing, peculiar, deep-seated pain; pain sprangling in front of ear and down neck; difficulty of opening mouth and of mastication; diminution or exacerbation of pain, devoid of periodicity; localization of pain in gum; swelling of gum till bitten upon and wounded by upper molars; high inflammation of gum; contiguous parts swollen; tenderness externally on pressure; enunciation and deglutition difficult to impossible; teeth closed; loss of appetite; confinement to bed; complete demoralization; nervous irritability; prostration, with quick and frequent pulse; excessive salivation; fetid breath; puffy, bloated lips; high fever; extensive suppuration; pyæmia and possibly death.

153. What is the treatment?

In the first stages treatment is palliative. Externally, about the seat of trouble—laudanum, spirits of camphor, strong infusion of hops, mixture of laudanum, tincture of aconite and chloroform (equal parts), aconitia ointment or other anodynes which do not disfigure. Internally—for wakefulness, 5 or 10 grains of Dover's powder, or 20 drops of laudanum, or 20 to 30 drops of solution of bimeconate of morphia, or a teaspoonful of solution of sulphate of morphia, or 1 grain of opium; when pain is localized, lance, making the X-incision frequently if necessary; if this is not relieving, insert under flap a small portion of dental acetate of morphia paste, with adjunct of cocaine or menthol, on cotton; if gums are lacerated, take off a block of gum; if teeth are shut, wedge open with soft wood, using anodynes or electricity externally, or a general anæsthetic if necessary.

154. How should the electrodes be placed?

Positive over otic ganglion; negative in hand of patient.

155. What are the indications for extraction of the six-year molars?

When it becomes improbable, at eleven years of age, that they will be preserved for any length of time; when pulp is devitalized before proper formation of root structure; when protrusion of either arch or other irregularity or false occlusion may be corrected by their removal.

DENTAL CARIES.

156. What is dental caries?

The softening and decalcification of tooth structure, analogous to ulceration of the soft parts.

157. What is the first cause?

A non-cognizable systemic influence, under which the non-essential portions of the economy are sacrificed for the conservation of the essentials.

158. What are the two divisions of the predisposing causes of caries?

General and Local.

159. What are the four divisions of *general* predisposing causes? Systemic, Thermal, Chemical and Parasitic.

160. Name some of the systemic predisposing causes.

General weakness, typhoid conditions, struma, rapid growth and depressing influences, such as enervating modes of living, anxiety, excessive study, undue exertion, pregnancy and nursing.

161. How do different diseases affect caries?

Indirectly only, by deranging the system and lowering the vitality; as a consequence, teeth of low-grade temperamental attributes decay most easily.

162. How does struma impress caries?

Struma, in the lymphatic temperaments, predisposes to rapid and painless decay; in the nervous temperaments, to sensitive, horny caries.

163. What are the three divisions of local predisposing causes? Structure, Form and Position.

164. Give the views taught in regard to influences dependent upon structure, form and position.

Structure—In proportion as teeth are of dense structure do they resist decay.

Form—Deep sulci, pits, depressions and fissures, though not necessarily productive of decay, render teeth more liable to caries.

Position—Crowded or irregular dentures seem more liable to decay from mechanical abrasion and from increased retention of food and mucus.

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165. What is meant by "periodicity" of caries?

Its recurrence at certain periods, modified by temperament and physical condition.

166. Give the periods of decay and comparative cessation from decay.

PERIODS OF DECAY. (Approximately.)	REASONS.	INTERVALS OF EXEMPTION. (Approximately.)
1st— 5 to 8 years.	Systemic effect of dis. of childhood.	8 to 12 years.
2d—12 " 20 "	Undue growth.	20 " 30 "
3d—30 " 35 "	Family and business cares.	35 " 45 "
4th—45 " 50 "	Approaching latter end of life.	{ Variable at 60 years.
5th—60 " 65 "	Beginning of dissolution.	65 to 70 years.
6th—70 " 75 "	Gradual loosening of hold upon life.	75 " 80 "
7th—80 years, at which time rapid senile decay may supervene, followed soon after by death of patient.		

167. What is taught in regard to the effect of a decaying tooth upon others?

By tending to localize upon itself the decay, it exempts for a time those less liable to disintegration.

168. How are males and females affected in different degree as regards caries?

Females are more liable to caries, because of indoor life, abnormal menstruation, pregnancy and care of children. Men have more fresh air and exercise, use tobacco, and, when free from excesses, are less likely to develop caries.

169. How does tobacco-chewing prevent caries?

By acting as a sialagogue, thus bathing the teeth in the alkaline saliva.

170. What theory of caries is taught?

"Mechanico-Chemico-Vital," with "Parasitic" concomitants.

171. What is the prophylactic treatment of caries?

1st, systemic treatment, according to indications; 2d, using at night Castile or carbolie soap, solution of bicarbonate of soda or lime water, with a soft brush; brushing hard on the articulating faces of teeth and lightly from gum down on inner and outer faces; dipping finger in chalk and rubbing into interstices of lower buccal teeth.

172. For what result is the use of these relied upon?

Castile soap is cleansing and antacid; carbolic acid soap is cleansing and antiseptic (it should be used to make a lather, which in turn should be rinsed through the spaces between the teeth), and is by far the best local prophylactic. The chalk corrects the acid condition of the mouth which supervenes toward morning; lime water and bicarbonate of soda are antacids.

173. What is taught in regard to pulverized pumice?

It is excellent for cleansing and brightening teeth and does not injure the enamel.

174. What is the relative liability of teeth to decay?

- | | |
|---------------------------|----------------------------|
| 1. Lower first molar. | 9. Lower second bicuspid. |
| 2. Upper first molar. | 10. Lower third molar. |
| 3. Lower second molar. | 11. Upper third molar. |
| 4. Upper second molar. | 12. Upper cuspid. |
| 5. Upper lateral incisor. | 13. Lower first bicuspid. |
| 6. Upper second bicuspid. | 14. Lower lateral incisor. |
| 7. Upper central incisor. | 15. Lower central incisor. |
| 8. Upper first bicuspid. | 16. Lower cuspid. |

175. Of what practical importance is the knowledge of this?

From the general stand-points of saving teeth, clasping plates or correcting irregularities, it is a safe guide to the saving of the best teeth.

176. How is methodic examination conducted?

Beginning at any back upper tooth, carefully examine every surface of each tooth in regular order, finishing on lower teeth.

177. Name the positions liable to decay on each tooth.

The mesial and distal faces of all teeth; the sulci of molars and bicuspids; the basilar pits of incisors and canines; buccal faces and cervical margins of molars and bicuspids; occasionally the labial and lingual surfaces of teeth.

178. What is needed for a thorough examination?

Mouth mirror, spring and flexible probes, ligating thread or floss silk, and wedges.

179. What purpose does thread or silk subserve?

When passed between teeth it indicates, by fraying, a roughened surface of enamel.

180. How should teeth be wedged?

By gently introducing a flock of cotton or thin wedge of soft pine between the teeth. This should be repeated several times,

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until the teeth are nicely separated. A thin piece of India rubber passed between teeth, or strong thread tied between teeth, may be useful where wedges are hard to start. When gum is to be pressed away, oil of cloves or oil of cinnamon should be placed on the cotton. Sandarac varnish touched to cotton wedge holds it in place. Jarvis's or Perry's separators are useful adjuncts in making examinations.

ODONTALGIA.

181. What is Odontalgia (toothache)?

Pain within or about a tooth or teeth.

182. What is the first cause of odontalgia?

Sensitive Dentine.

SENSITIVE DENTINE.

183. What are the four primary divisions under which sensitive dentine is discussed?

1st, Cases with no perceptible cavities of decay; 2d, Superficial Caries; 3d, Simple Caries; 4th, Deep-seated Caries.

184. What are the symptoms of sensitive dentine?

Uneasy sensations, which may be located about the teeth, jaws, cheeks, eyes, nose, or even lips; position of cause of trouble not positively located unless touched; aggravation from *contact* of salts, sweets and sour *generally*; from hot and cold applications *frequently*; from touch *markedly*—especially from finger-nail and metallic touch.

185. What is the special diagnostic of sensitive dentine?

Pain upon touch; cessation of pain upon removal of contact.

186. When examining for sensitive dentine what should be especially remembered?

To locate each place when examined, as the sensitivity is frequently temporarily obtunded by a single touch.

CASES WITH NO PERCEPTIBLE CAVITIES OF DECAY.

187. What are the locations for these?

1st, at the necks of teeth; sometimes denuded, sometimes not; 2d, in sulci; 3d, upon the cusps, cutting edges and smooth articulating faces of teeth.

188. What is their appearance?

Sometimes imperceptible; either hard, smooth and polished, or slightly soft under touch of excavator; sometimes discolored; unaltered in contour, or more or less sharply concave, as though worn by brush, but not always due to this.

189. What are the systemic considerations in regard to acid vegetables, condiments and medicines?

They induce a hyperacid condition of the stomach, and a consequent hyperacidity of the fluids of the mouth, causing sensitive dentine, setting the teeth on edge, increasing the tendency to decay, and producing general soreness of the teeth.

190. What is the systemic treatment?

1st, forbid indulgence in acid fruits and the like for a few days or weeks, according to the severity of the case; 2d, correct hyperacidity of stomach by a half grain to two grains of bicarbonate of soda (or a quarter grain of carbonate of ammonia) in a tablespoonful of water, three or four times daily. Give the ammonia, if a diffusible stimulant would be desirable. When the trouble is but slight, fruits, etc., may be indulged in if medicine be used continuously to counteract the hyperacidity.

191. What are the applications to be made by patients?

Lime water, bicarbonate of soda, prepared chalk, phénol sodique (diluted), aqua ammonia (diluted), Castile and carbolic acid soaps.

192. What severe complications pertain to sensitive dentine aside from toothache?

Facial neuralgic complications, including otalgia and ophthalmalgia.

193. What is the cure for these?

Remove the cause.

SUPERFICIAL CARIES.

194. What is taught in regard to removal of superficial caries in teeth proportionately liable to become carious?

Superficial caries is that form of decay which admits of easy removal by files, burs, disks or chisels. In teeth liable to become carious, it should be left until its progress indicates the introduction of a filling.

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195. What is the treatment of sensitive dentine in this connection?

The same as in simple caries.

SIMPLE CARIES.

196. What is simple caries?

That depth of cavity which first requires a filling material.

197. What is deep-seated caries?

Cavities of such depth as render irritation of the pulp liable during medicating, excavating or filling, or as the result of the operation.

198. What is the first remedy for sensitiveness in cavities of simple caries? Why advantageous?

Dryness. It obtunds sensibility, as dryness of the tongue interferes with taste.

199. What is the second remedy?

Rapid cutting with *sharp* excavators or burs.

200. What is the rationale of this?

The suddenness of the infliction modifies response.

201. What is the proper method of doing this? Why?

Cut from within outward, or bur slight undercut at the bottom and remove the periphery afterward. By these means the organic filaments are severed, and cannot conduct sensation from the outer portions to the pulp.

202. In engine work, what is the advantage of "motor" power over foot power?

Foot power is surging; "motor" power gives steadiness.

203. *Topical Applications*. What are the four class divisions of these medicaments?

1st, those which *do not* endanger the vitality of the dental pulp; 2d, those which *may possibly* endanger the pulp; 3d, those which *are liable* to endanger the pulp; 4th, that which is dangerous to the pulp.

204. *First*. Name the remedies which do not endanger the pulp.

Prepared chalk, bicarbonate of soda, oil of cloves, eugenol, aqua ammonia fortior, tannin Nos. 1 and 2, solution of chloral hydrate, nitric acid (because never used except in superficial

sensitive dentine), dental tincture of aconite, menthol and muriate of cocaine.

205. Where are chalk and bicarbonate of soda to be used?

In cavities where moisture cannot be excluded; they require moisture to produce effect.

206. Where should ammonia be used? The objections to its use?

In dry cavities, guarding the air-passages. Objections—Its pungent odor, irritant effect on soft tissues, and its liability to weaken with age.

207. Where is nitric acid efficacious?

In dry cavities of hard teeth, accurately applied to sentient point on a gold probe, guarding the surrounding tissues; it eats out the cavity; should be neutralized with bicarbonate of soda.

208. How should cocaine be used?

In crystal form only, by placing a minute quantity into the cavity, which is slightly moistened with oil of cloves. Solutions are of little avail.

209. How are oil of cloves and eugenol to be used?

In sensitive cavities, when teeth require wedging; placed on the cotton wedge, they also obtund the gum while pressing aside.

210. *Second.* Name the remedies which may possibly endanger the pulp.

In deep-seated caries—Creasote and carbolic acid (idiosyncratically), carbonate of potassium, caustic potash and chloride of zinc. (See Medicaments.)

211. *Third.* Name the remedies which are liable to injure the pulp.

Chromic acid, phosphoric acid and ethylate of sodium.

212. What is taught of phosphoric acid?

It should not be used, owing to its inferred devitalizing action upon the pulp.

213. Why is chloride of zinc called a "polychrest?"

Because of its wide range of medicinal application.

214. What is the range of medicinal application of chloride of zinc?

Detergent, tonic, astringent, stimulant, irritant and escharotic.

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215. What is the proper form in which to use chloride of zinc as an obtundent of sensitive dentine? Why?

Deliquesced. Because no action will take place unless deliquesced, and further dilution renders it irritant instead of escharotic.

216. What should be the condition of the cavity when applied?

As dry as possible, to produce the greatest effect.

217. What is the method of preparing chloride of zinc for dental use?

Refer to Medicaments.

218. What is the taste of chloride of zinc?

Sweetish-bitter, metallic, astringent taste.

219. What is the method of applying chloride of zinc?

From a probe, pointed stick, pellet of cotton or bibulous paper, or by oxychloride filling.

220. What treatment should precede the chloride of zinc application?

Systematic consecutive obtunding. (See 252.)

221. What are the usual sensations from chloride of zinc applications?

Painful sensations.

222. What is the peculiarity of the pain?

Cold, steadily increasing and steadily diminishing pain.

223. How long should the pain continue?

From three to ten or fifteen minutes.

224. What should be the characteristic of the pain?

Steady, full, round, bearable.

225. What kind of pain *may* supervene?

Throbbing, pulsating, jumping pain.

226. What does this signify, and how is it treated?

However slight, it signifies pulp irritation. It is to be treated by syringing cavity with tepid water and applying oil of cloves, phénol sodique, tincture of benzoin, eugenol or Jamaica dogwood.

227. What are the points in regard to excavating after chloride of zinc applications?

Begin on cessation of pain and excavate only that dentine which has been obtunded.

228. What care must be taken in repeated applications of chloride of zinc?

The fact of pulp approach must be considered and care taken not to irritate it.

229. What is the after-preparation of a cavity in which the dentine has been obtunded by chloride of zinc?

Neutralize by washing cavity with tepid water, then dry thoroughly, moisten dentine with oil of cloves, and dry again.

230. How is the application of carbonate of potassium prepared for dental use?

See Medicaments.

231. What is the method of applying it?

From a probe, sharp-pointed stick or pellet of cotton.

232. What is its effect? What are the symptoms?

It obtunds sensitivity. Symptoms—Like those produced by chloride of zinc, but much less severe.

233. How is it neutralized?

By oil of cloves.

234. What is taught regarding it?

It is a safe and ordinarily reliable remedy.

235. What are the characteristics of chromic acid?

Its form is that of brilliant crimson-red crystals. It is a deliquescent salt.

236. In what form should chromic acid be used as an obtundent?

Deliquesced.

237. In what manner should one guard against danger?

Never rely upon the "rubber-dam" guard, as the acid is liable to get beneath it; have cavity as dry as possible without it; use chromic acid only in easy or accessible cavities in hard teeth, frequently neutralizing with dry chalk or bicarbonate of soda.

238. Why?

Because it is a very dangerous and uncontrollable remedy, and is only indicated in extreme cases.

239. What are the symptoms accompanying its use?

Perfect quiet for a time, which may result in death of the pulp.

240. What is the indication for the use of chromic acid?

When chloride of zinc fails to produce other than a persistent, disagreeable pain.

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241. What of the employment of chromic acid in difficult places?

It should *never* be used in such places.

242. What is the after-treatment of cavity?

It is to be neutralized by syringing thoroughly with tepid water, made alkaline with bicarbonate of soda; the cavity is then treated as in chloride of zinc applications.

243. What dangers are liable from chromic acid and ethylate of sodium other than danger to pulps?

They are liable to produce unmanageable ulcerations and sloughing sores.

244. What is taught of ethylate of sodium?

It is an obsolete remedy.

245. *Fourth.* That which is *dangerous* to pulps. Give the various names of this medicament.

Arsenic, white oxide of arsenic, arsenious acid, ratsbane. (See 446.)

246. What is cobalt? To what is its obtunding power due?

A brittle, reddish-gray metal; magnetic; slowly oxidizes in the air. Occurs in combination with arsenic, to which it owes its obtunding power.

247. What is taught in regard to the use of arsenious acid or cobalt for obtunding sensitivity of dentine?

It should never be used, as sooner or later it will probably devitalize the pulp.

248. What is taught in regard to the use of arsenious acid or cobalt in very small quantities, and for limited periods of time, to insure safety?

If used *at all*, it is liable to cause the death of the pulp.

249. What are the materials deemed best as pulp-protectors against such medicaments as *may possibly* or are *liable* to endanger the pulp?

Temporary stopping, capping varnishes.

250. How is temporary stopping applied?

Warmed and pressed into a wafer of desired size, picked up with a warm probe, softened and placed in position, and the edges sealed with a warm burnisher. It makes an impervious and non-irritating protector.

251. What is taught regarding zinc phosphates in this connection?

As their ultimate action upon the pulp is as yet undetermined, it is better not to use them. (See 212.)

252. What are the systematic consecutive applications for the obtunding of sensitive dentine in deep-seated caries?

Prepared chalk,	} Antacids.
Bicarbonate of soda,	
Aqua ammonia fortior,	

1. Oil of cloves or eugenol.

2. Pressure, with burnishers, on sides of cavity.

3. Muriate of cocaine (crystals). (See 208.)

This failing, dry cavity and nicely adapt wafer of temporary stopping for pulp protection. This remains permanently. (See 250.)

Then apply—

4. Tannin No. 1,	} Driers.
5. Tannin No. 2,	

6. Carbolic acid.

7. Carbonate of potassium (drier).

8. Chloride of zinc (escharotic).

If carbonate of potassium seem indicated, begin with oil of cloves and medicate consecutively to carbonate of potassium; if chloride of zinc seem indicated, begin with carbolic acid.

253. How long need each application remain in the cavity?

Only till the succeeding one is ready for application.

254. When other means fail, what three local means may be resorted to?

Heat, cold, electricity.

255. What are the various forms of heat?

Hot air, galvanic cautery, thermo-cautère.

256. What is the galvanic cautery?

A platinum-wire loop, heated by a current of electricity. It should be rapidly but deliberately touched to the sensitive portions.

257. What are the various forms of cold?

Cold air, ice, spraying of sulphuric ether, rhigolene or other volatile liquids on the tissue to be obtunded.

258. How is electricity used?

By means of the "Dental Helix."

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259. What three important considerations govern the application of a current?

1st, it must be an interrupted primary induction current, because not rasping; 2d, the current must range from imperceptible to that of sufficient strength; 3d, the increase and decrease of current must be under control of the patient.

260. How should the poles of a dental helix be placed for the excavation of sensitive dentine?

By means of dental electrode. For front teeth—Small sponge; *negative* on gum at tooth; *positive* in hand. For back teeth—Large sponge; *negative* on cheek or jaw; *positive* in hand.

261. What unpleasant results may follow electricity?

May cause tonic spasms or partial paralysis.

262. If unpleasant sequelæ follow electricity, how are they to be removed?

Reverse the current.

263. What medicaments are recommended for general or systemic effect in modifying sensitivity of dentine?

Sulphate of morphia, opium, laudanum or paregoric; and, when opium is idiosynceratically contra-indicated, solution of bimeconate of morphia, in alternation with asafœtida. A two-grain asafœtida pill (sugar coated) or a teaspoonful of syrup of lactucarium at tea-time, with ten to twenty drops of the solution of bimeconate of morphia at bed-time, and a repetition of the bimeconate of morphia solution an hour previous to the operation, induces a quieted state of the nervous system, modifying sensitivity.

264. What is the last resort?

To produce general insensibility.

265. How is this effected?

By partial anæsthesia, or by hypodermic injections of the solution of sulphate of morphia and atropia.

266. What is taught of the safety of anæsthesia?

The agent must be thoroughly understood. No agent which in a minute or two can produce total exemption from pain during a severe operation can be regarded as *perfectly safe*.

DEEP-SEATED CARIES.

267. What is deep-seated caries?

See 197.

268. What is the general condition of cavities in deep-seated decay?

They are full of decomposing material, and more or less broken-down tooth structure.

269. How may more injury than benefit be inflicted?

By removing too much of the decalcified dentine.

270. What is the twofold action of cavity contents?

1st, protective—protecting pulp from thermal changes; 2d, detrimental—destructive to tooth tissue and irritating to pulp from putrescence.

271. What is the first step in preparation?

Gently stir *débris* with a probe, and syringe with tepid water; dry with bibulous paper or absorbent cotton; if indicated, break down enamel edges for free ingress.

272. What is to be especially avoided?

Any irritation, shock or compression of the pulp.

273. How should such cavities be syringed?

Gently, with tepid water (decidedly warm, but not hot), directing the stream away from pulp and toward the cavity walls. The syringe should be filled and emptied several times before using, to preclude the presence of cold water in the jet.

274. Into what three classes are such washed and dried cavities divided?

1st, those containing white decay; 2d, yellow, gray, brown and black decay; 3d, decay of horny consistency.

275. Give some peculiarities concomitant with soft white decay.

Cavity edges soft, easily broken down; large fractures liable, with but slight force; decayed material short-grained and homogeneous; permits of easy removal and ready ingress to dangerous proximity to pulp. Excavate carefully; usually little or no sensation or warning of approach to pulp.

276. Give peculiarities concomitant with yellowish, brownish and blackish decay.

External edges of varied strength, all reasonably strong; reasonable amount of warning sensitivity; marked change of color, even over pulp horns.

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277. Give peculiarities concomitant with decay of "horny" consistency. What caution should be observed?

The decay is long-grained and tough. Cut with keen instruments from *within out*, to avoid exposing the pulp, as the grain runs deep.

278. What is taught relative to conservation of this decalcified dentine?

It is the best known pulp-capping; hence should be judiciously conserved, that it may recalcify.

279. What portions should be conserved?

All that does not interfere with the integrity of the filling.

280. What governs its medication?

Decalcification being due mainly to action of acids, medication should be: 1st, alkaline, to neutralize acidity; 2d, soothing and pulp-protecting; 3d, avoidance of coagulating, irritating, escharotic or disorganizing medicaments, such as carbolic acid, creasote, chloride of zinc and strong acids.

281. What considerations govern the choice of filling materials?

1st, position of cavity; 2d, physical characteristics of tooth structure; 3d, strength or weakness of cavity walls; 4th, thickness or tenuity of dentine covering pulp.

282. What materials are suggested for filling such teeth?

Intermediates of plaster of Paris, oxysulphate, temporary stopping or arnica plaster; linings of varnish, oxychloride, oxyphosphate and zinc phosphate; fillings of gutta-percha, oxychloride, zinc phosphates, amalgam and tin, or gold with linings.

283. What governs the introduction of such fillings?

Avoidance of pain from pressure, gentle or lateral packing of material, or arching over pulp, increasing solidity towards surface.

284. Besides danger from *immediate* trouble, what dangers are *prospective*?

Irritation of pulp from thermal changes, prevention of exudation from pulp, and devitalization of dentine between the pulp and filling material.

285. How are pulps covered with dentine sometimes exposed after filling such cavities?

By death and disintegration of the film of dentine between the pulp and filling material.

286. How are pulps naturally protected ?

By "recalcification," "tubular consolidation" or deposition of "secondary dentine."

287. What is meant by recalcification ?

The replacement by the pulp of the inorganic matter of the dentine. (See 280.)

288. What is meant by tubular consolidation ?

An excessive deposit of calcific matter in the dentinal tubuli, between the pulp and the external irritant.

289. What is meant by deposition of secondary dentine ?

A formation of dentine within the boundaries of the physiological pulp cavity.

290. What is the second cause of odontalgia ?

Irritation of the dental pulp prior to exposure.

291. What five classes of irritants are spoken of under this head ?

Mechanical, chemico-vital, vitiated fluids of the mouth (when notably acid), thermal changes and infiltrations. (See 354.)

292. Give example of mechanical.

Impacting of food or other pressure.

293. Give examples of chemico-vital.

Decomposing food and seeds.

294. What is the sign of vitiated fluids of the mouth ?

Glairy viscosity, or "spider-web" appearance of the saliva.

295. Which teeth are most liable to be affected by cold air ?

The upper incisors and cuspids, and lower incisors, cuspids and bicuspid.

296. Which is generally most irritating, hot or cold ? Why ?

Cold. Because ice water at a temperature 60° below blood heat (98°) is easily borne in the mouth, while liquids 40° above blood heat can scarcely be endured; it follows that cold can cause more deviation from the normal temperature by 20° , and be to that extent the more irritating.

297. What infiltrations are irritating ?

Salt, sweet and sour.

298. What are the symptoms of pulp irritation in such cavities ?

Uneasy sensations, *generally positively located* at periods of recognized irritation; no sharp, paroxysmal attacks; no increase of pain upon pressure on tooth; no throbbing.

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299. What is meant by "spontaneous" pain?

Pain occurring in the absence of any tangible irritant.

300. How does this influence prognosis?

Unfavorably; the abnormality thus indicated is rarely combated successfully.

301. What is taught in this connection regarding *masses* of decayed dentine?

In conservative treatment of the pulps of poor teeth it is essential that the largest possible amount of the decalcified organic mass should remain in protected security.

302. What pulp considerations are referred to in this connection?

The pulp considerations bearing upon the future value of this conserved dentine are: The comparative normality of the pulp, its probable and possible recuperative power, together with the temperamental attributes and physical condition of the patient.

303. What two objects are gained by conservation of decayed living dentine?

1st, the prevention of exposure and undue approach to pulp;
2d, possession of an *organized* matrix, which, being "protected," may *recalcify*.

304. For the proper preparation of a cavity containing "horny" decay, what is necessary?

Dryness, secured by napkins or rubber dam.

305. What may follow dryness and be caused by it?

Pain.

306. What is the best application for the relief of this?

Oil of cloves.

307. Is pulp conservation universal under such treatment?

In a vast majority of cases it is successful, but not universally so. Marked adynamic complication, with poor and non-recuperative temperaments, together with local and systemic influences, are factors which produce failures in this direction.

308. What are the indications of success?

Gradual establishment of comfort, with but few periods of uneasiness or of recognized irritation.

309. What are the indications of danger?

Sensations of uneasiness; occasional thought of tooth, accompanied with undefined apprehension of trouble.

310. What are the symptoms of failure?

Increasing response to heat; occasional odontalgic and neuralgic pain; no pain at first on pressure, but perhaps pain on tapping, owing to concussion of pulp, not to peridental irritation; no sensation of elongation of tooth; uneasiness and pain, intermittent or remittent, according to degree of aggravation, *but not periodic*; sometimes but little discomfort while pulp quietly dies, and sometimes such toothache as calls for immediate relief.

311. What are the symptoms accompanying the more marked cases?

Acute response to hot and cold, inducing paroxysms of odontalgia; tenderness on pressure from determination of blood, with its concomitant hyperæsthesia, outside of apical foramen.

312. What is the notable exception to these symptoms?

Congestion of the bulbous portion of the pulp, precluding response to heat and cold.

313. What is taught of "facial neuralgia" in this connection?

This gradual death of the pulp may produce neuralgic troubles of almost every grade of intensity and duration, intermittent or remittent, according to degree of aggravation, but not periodic.

314. What are the locations of the neuralgic pain?

From a superior incisor or cuspid, below the eye and in the cheek and upper lip; from a superior bicuspid or molar, upward over the eye and *into* the ear; from lower anterior teeth, decidedly localized about the chin and lower lip; from lower molar, backward to the eye, down the neck; in rare cases even to the arm and hand. The salivary glands also appear to be excited to excessive secretion.

315. What are the possibilities in connection with congestion of the pulp?

Absorption of effusions and re-establishment of normality; chronic congestion without positive trouble for an indefinite period; active or passive death, and putrescence or mummification, such possibilities being controlled by age, temperament and physical condition.

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316. What is the summary of causes of irritation in deep-seated caries?

1st, vitally, by irritating and escharotic applications; 2d, mechanically, by excavating; 3d, by pressure, the result of plugging; 4th, by conduction or other irritation after plugging.

317. What is the summary of remedies?

1st, judicious applications and proper protection; 2d, care in excavating and accurate knowledge of the location of pulp cavities; 3d, by using lateral pressure, judicious impacting of foil, the interposition of a solid base to sustain unavoidable pressure, or the employment of plastic filling materials; 4th, interposition of non-conducting or porous intermediate material.

318. Name some intermediates.

Temporary stopping, gutta-percha, arnica court-plaster, adhesive plaster, shred tin, crystal gold, sheet lead, tin foil, muslin dipped in camphor, quill, cork, ivory.

319. How is arnica court-plaster prepared for use?

A piece cut to proper size should be laid, back down, in a drop of water for fifteen minutes, and the application gently made, first removing excess of water by touching back of the plaster to bibulous paper.

320. What are recommended as non-conducting and supporting intermediates in deep decay?

1st, metal plate, fitted, warmed and placed in cavity, with temporary stopping underneath, adhering both to it and to the dentine; 2d, temporary stopping, covered with oxychloride or zinc phosphate, which can, at the same time, subserve a purpose as a lining.

321. What are the gradations from "deep decay" to exposure?

1st, very deep decay; 2d, nearly exposed pulp; 3d, quite exposed pulp.

322. Are these always of equal import? Why?

No. Because "deep decay" in the nervo-lymphatic tooth would call for all the care and skill required in an "almost exposed" pulp of a nervo-sanguine tooth, and the comparatively simple "nearness of decay to the pulp" in the bilio-lymphatic tooth is equivalent to "absolute exposure" in the bilio-sanguine. (See 337.)

323. What are the eight controlling influences in conservation of pulps?

Age, temperament, physical condition, sex, occupation, over-exertion (mental or physical), place of residence and mode of living, thermal and barometric changes.

324. To what times of life does "age" refer?

Youth, maturity and old age. These are again subdivided into periods of decay and comparative cessation from decay. (See 166.)

325. What is "temperament"?

"A peculiar state of the constitution depending upon the relative proportion of its masses and the relative energy of its different functions."—*S. R. Wells*.

326. Of what importance is a knowledge of temperaments to a dentist?

A knowledge of the temperament is, when coupled with a knowledge of the age, physical condition, occupation and surroundings of an individual, a basis upon which to calculate all treatment of the teeth and to prognose all probabilities in connection therewith. In dental prosthesis it governs the sizes, shapes, shades and relative positions of artificial teeth.

327. What is the first division of temperaments?

Four basal temperaments—Bilious, Sanguine, Lymphatic and Nervous.

328. What is the second division of twelve "dual" temperaments?

1st, Sanguo-bilious, Lymphatico-bilious, Nervo-bilious; 2d, Bilio-sanguine, Lymphatico-sanguine, Nervo-sanguine; 3d, Bilio-Lymphatic, Sanguo-lymphatic, Nervo-lymphatic; 4th, Bilio-nervous, Sanguo-nervous, Lymphatico-nervous.

329. Into what two classes are temperamental attributes divided?

Internal and External. (See 330.)

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INTERNAL AND EXTERNAL TEMPERAMENTAL ATTRIBUTES (330).

INDICATIONS.	BILIOUS.	SANGUINE.	LYMPHATIC.	NERVOUS.
EXTERNAL ATTRIBUTES OF THE INDIVIDUAL.	Dark, sallow complexion; black hair, eyebrows and beard; spare and even measure person, whether tall or short; angular development; black or very dark eyes, with a peculiar yellowish cornea; purplish-blue lips.	Fair, florid complexion; light-brown hair; blue, brown or gray eyes; full, red lips; good general development.	Skin pallid; hair either light or dark; thin, straight, and of a soft, matted, damp kind; eyes either light or dark, hollow and leadeny; bulky general development.	Indicated more by the quick and frequent manifestations of energy, acute sensibility, nervous debility and systemic prostration, than from physical exterior.
INTERNAL ATTRIBUTES OF THE INDIVIDUAL.	Dense structure, with strength, permanence, capability and persistence; good and determined recuperation; solid but stolid mental endowments; tendency to biliary and digestive derangements.	Solid structure, with volume of nutrition; reliable and hopeful recuperation, from molecular to systemic; solid but florid mental endowments; tendency to lung and heart derangements.	Bulk; looseness of tissue and structure, tending more toward feebleness; lacking in strength; tardy and feeble of recuperation; liable to degeneration and relapse; perceptions not quick; tendency to dropsy, scrofula and chronic affections.	Comparatively dense in structure; good organization, lacking perfect solidity; quickness and frequency of recuperation and resistance, rather than reliability and permanence; great perceptivity, with facility and rapidity, rather than reliability and persistence; tendency to nervous diseases.
EXTERNAL ATTRIBUTES OF TEETH.	Yellowish, waxy color; slightly narrow at neck; angular; long in proportion to breadth; strongly fixed in the jaw.	Creamy color; average teeth of even size from neck to cutting edge; worn cutting edges; rounded cusps; strongly fixed in the jaw.	Dull grayish-white in color, often with opaque whitish or brownish spots; large and broad; thick and rounded cusps; loosely fixed in the jaw.	Long and brilliant pearly-colored teeth; decidedly narrower at neck than at cutting edge.
INTERNAL ATTRIBUTES OF TEETH.	As the individual, so the tooth.	As the individual, so the tooth.	As the individual, so the tooth.	As the individual, so the tooth.

331. From what three stand-points are the internal attributes considered?

General circulation, innervation and nutrition.

332. What is the grouping of temperaments for dental study called?

Dento-temperamental.

333. What is a dental temperament?

A binary or tertiary temperament—*i. e.*, one which names last the prominent characteristic and first the modifying attribute. In "bilio-sanguine," sanguine is predominant, modified by bilious. A still slighter modification is expressed, as in lymphatico-bilio-sanguine, or nervo-lymphatico-bilio-sanguine.

334. Why is the dual system adopted in this classification?

It is usually sufficient; modification of it must be studied from the indications.

335. Name the four classes into which temperaments are divided dentally.

- | | |
|-------------------------|----------------------|
| 1.—Bilio-sanguine. | 3.—Sanguo-lymphatic. |
| Sanguo-bilious. | Bilio-nervous. |
| 2.—Lymphatico-sanguine. | Sanguo-nervous. |
| Lymphatico-bilious. | Lymphatico-nervous. |
| Nervo-bilious. | 4.—Bilio-lymphatic. |
| Nervo-sanguine. | Nervo-lymphatic. |

336. What are the characteristics of each *class*?

1st, "Excellent;" 2d, "Good;" 3d, "Doubtful and anxious;" 4th, "Positively bad."

337. If sanguo-bilious follows bilio-sanguine, why does not sanguo-lymphatic follow lymphatico-sanguine?

It will be seen that the reliable, hopeful and recuperative base of the lymphatico-sanguine becomes merely a slightly controlling influence over the utterly unreliable and non-recuperative base of the sanguo-lymphatic, while the bilious and sanguine attributes, when combined with each other, either as base or modifier, form two dental temperaments which are unsurpassed.

338. What are the characteristics of each dental temperament?

See 339.

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CHARACTERISTICS OF DENTAL TEMPERAMENTS (339).

INDICATIONS.	BILIO-SANGUINE.	SANGUO-BILIOUS.	LYMPHATICO-SANGUINE.	LYMPHATICO-BILIOUS.
SIZE AND GENERAL FORM.	Above average in size (height not a factor); broad shoulders; full chest; males well rounded and muscular; females well and roundly developed.	Above average in size; form irregular and angular.	Above average in size; round, though not superfluous development; look lighter weight than really are; are solid; have high instep; small hands and feet	Decidedly above average in size; form same as bilio-sanguine.
COMPLEXION AND SKIN.	A smooth, soft, fine skin, and clear, glowing, olive complexion.	Skin fairly smooth; but little color; complexion dark and yellowish.	Very smooth and soft; sometimes freckled; complexion from ivory whiteness to pinkish, and even florid.	Skin dark; not smooth; tendency to eczematous spots, moles, taches and freckles.
CONTOUR OF HEAD AND FACE.	Cheeks, jaws, forehead and chin all rounded, large and well formed.	Cheeks broad; forehead large and square; jaws large, angular and strong; chin large and square.	Cheeks round and handsome; full but not puffy; forehead average; jaws medium and full.	Cheek, forehead, jaws and chin large.
HAIR.	Not black, but very dark; luxuriant of growth and of fine quality; wavy, not shortly curly; beard nicely planted; eyebrows marked and decidedly arched.	Very nearly or quite black; coarse and curly; beard universal, rather than handsomely planted; eyebrows decided; usually more straight than arched.	Light chestnut; decidedly inclined to curl; beard well planted; not heavy; eyebrows darker chestnut than hair, and moderately arched.	Dark, with wavy tendency; luxuriant in quantity and coarse; beard full and wavy; eyebrows dark, full and marked.
EYES.	Large, dark, lustrous and expressive, but not particularly perceptive in expression.	Very dark or black; strong, rather than lustrous in expression.	Gray-blue and expressive.	Dark and usually strong.
NOSE.	Fine and shapely.	Large and decided in contour.	Shapely.	Large; considerable breadth.
MOUTH AND LIPS.	Mouth moderately large, full and shapely; lips full and florid.	Mouth rather large; lips average in size, inclined to large, and of brownish color.	Mouth medium; often beautifully shaped; lips dark pink.	Mouth large; lips usually firmly set and of brownish color.
COLOR OF TEETH.	Rich, dark cream color.	Dark yellow.	Grayish cream.	Yellowish.
SIZE AND SHAPE OF TEETH.	Average size, with nicely-developed edges and cusps.	Large and angular; strong edges; large cusps.	Average; shapely edges and cusps.	Short and thick, having heavy edges and cusps.
STRUCTURE OF TEETH.	Elegant enamel; splendid dentine; firmly planted in jaw.	Splendid enamel; strong dentine; very firmly planted in jaw.	Enamel good; dentine good; well planted in jaw.	Enamel strong of good polish; dentine good; well planted in jaw.
DECAY OF TEETH.	Not liable to decay; small crevices in sulci not necessarily to be filled.	Same as in bilio-sanguine.	Caries is, throughout life, generally confined to a few teeth.	Average in rapidity.
STYLE OF ARCH.	Rounded.	Flat-arched; cusps prominent.	Rounded.	Flattened; cusps prominent.
SENSITIVITY OF DENTINE.	Not particularly sensitive.	Not particularly sensitive.	Usually not particularly sensitive; sometimes so.	Not particularly sensitive.
VITAL FORCE.	Equal to any emergency; make great efforts with apparent ease.	Decided capability for arduous undertakings; persistent recuperative powers are modified by tendency to despondency.	Good.	Good recuperative force, which requires proper direction and help; not so hopeful as lymphatic sanguine, but more persistent.

INFLAMMATORY CONSIDERATIONS.	"Determination" to pulp seldom develops "congestion," but rather deposition of secondary dentine; if individual is systematically predisposed by exhaustion and cold be taken, pneumonia and death often quickly follow; a pulp, under like circumstances, may die thus suddenly.	Very decided irritation is required to produce marked inflammation.	Average.
CONSERVATION OF PULP.	If exposed, can easily conserve; may even be wounded by instrumentation, or eschared by creasote and will still survive; always cap if convenient; deposits secondary dentine; requires little or no local medication; should, however, avoid conduction by filling.	Apply soothing, constringing and porous cappers (oxysulphate or plaster of Paris) if nearly or quite exposed; in deep decay apply intermediates.	Treat as in lymphatico-sanguine.
TREATMENT IN PERIODONTITIS.	1st grade.—Remove cause. 2d grade.—Add sedation (dental aconite). 3d grade.—Sedate and apply guard. 4th grade.—Stimulate to suppuration.	1st grade.—Remove cause and sedate. 2d grade.—Add guard. 3d grade.—Stimulate to suppuration.	Same as in lymphatico-sanguine.
GENERAL PERCEPTIVITY OF PAIN.	Very little perception of pain; cavities seldom noticed until deep-seated.	Average appreciation of pain.	Average.
CONSIDERATIONS PERTAINING TO FILLING.	In these teeth gold is an excellent filling material.	Same as in bilio-sanguine; dentine less tolerant; gold less compatible.	Same as in lymphatico-sanguine.
GENERAL CHARACTERISTICS OF TEMPERAMENT.	Have sanguine beauty and hope, and bilious strength; are often beautiful and graceful; not particularly perceptive, but speak in graceful, winning manner; pay little attention to trifles; endure severe pain; the men are often found at the head of gigantic enterprises.	Have a nutrient, hopeful, self-reliant, sanguine base, modified by the lymphatic slowness and bulk; have good natural desires and tendencies, which require support.	Have bilious strength and despondency, with lymphatic bulk and slowness; are adapted to complicated work, requiring long, strong, steady, patient effort; resist infringement of rights; like to appear prominent; are suave to superiors.
SPECIAL SENSES.	Smell, taste, etc., very good; not particularly acute.	Good; not acute.	Average.

CHARACTERISTICS OF DENTAL TEMPERAMENTS (339).

INDICATIONS.	NERVO-BILIOUS.	NERVO-SANGUINE.	SANGUO-LYMPHATIC.	BILIO-NERVOUS.
SIZE AND GENERAL FORM.	Less than average size; small muscular development; average osseous and contour development; small and tapering limbs and waist; small feet, with high instep; small, delicate hands.	Above average in size; well built; broad shoulders; deep chest.	More than average size; full, round development.	Less than average size; decidedly less than average osseous, muscular and contour development.
COMPLEXION AND SKIN.	Skin inclined to dark; not broken in freckles unless scrofulous, when it is rough and scaly.	Fair and finely florid.	Soft and smooth; color ranging from ivory white to handsome pink, and even florid.	Dark and inclined to freckle.
CONTOUR OF HEAD AND FACE.	Head small; cheek-bones high; forehead large; "chin and jaws small.	Forehead broad; cheeks full; jaws average; chin average and round.	Cheeks large and full; forehead large and moderately high; jaws full and round.	Cheeks high-boned and prominent; forehead broad in proportion to rest of face; chin and jaws small.
HAIR.	Dark brown and almost invariably curly; of average quantity and quality; sparse towards middle life; eyebrows decidedly marked, but not decidedly arched; beard sparse and unequally planted, mostly upon cheeks, high up, upon upper lip and chin, having a thinly-planted space between.	Sandy to red; full in quantity and fair in quality; beard sandy to red and wavy; eyebrows light and arched.	Dark to light chestnut; straight or wavy; of average quantity, sometimes luxuriant and of good quality; eyebrows dark, not too arching; beard not heavy; brown and soft.	Of the peculiar range from dark brown (almost black) to dark red (mahogany), and of all grades, both in quantity and quality; eyebrows either decidedly arched or almost straight, but usually marked; beard sometimes heavy, sometimes scanty, ranging in color like the hair.
EYES.	Dark brown; of average size and very perceptive in expression.	Light hazel to clear blue; usually above average in size.	Light in color; large and mildly hopeful in expression.	Less than average size; in color from hazel, or even lighter, to dark brown or almost black; twinkle when pleased or snap when angry.
NOSE.	Almost always a shapely aquiline, having a mark on ridge.	Usually shapely and inclined to large.	Usually shapely.	Generally thin and either prominent at bridge or pointed and somewhat upturned.
MOUTH AND LIPS.	Mouth average; lips thin and shapely; of purplish color.	Mouth average, but with a fullness and redness of lips which give it an appearance of more than average size.	Mouth large; lips full and of red color.	Mouth average; lips may be either thin or full and of purplish color.
COLOR OF TEETH.	Yellow at neck; bluish at cutting edge.	Rich cream color.	Creamy gray.	Generally bluish.
SIZE AND SHAPE OF TEETH.	Long and narrow, with long cusps; much narrower at neck than at cutting edge.	Average size; handsomely shaped; shapely edges and cusps.	Above average in size; broad; shapely edges and cusps.	Variable in size and form; sometimes broad, sometimes long, with narrow necks and long cusps.
STRUCTURE OF TEETH.	Enamel hard; dentine highly organized, but rapid to decay; well planted in jaw.	Enamel and dentine excellent; well planted in jaw.	Enamel fair; fairly firmly planted in jaw.	Enamel and dentine very soft; fairly firm in jaw.

DECAY OF TEETH.	Tendency to rapid horny decay of dentine, with but slight decay of enamel; the bicuspids and laterals are often markedly pre-disposed to decay.	Develop circumscribed decay.	Rapid and extended.	In a few months large general decay may supervene.
STYLE OF ARCH.	Narrow in front, with cuspids prominent.	Rounded.	Rounded.	Flat and square anteriorly, with tendency to concavity on sides.
SENSITIVITY OF DENTINE.	Exquisite; always obtund.	Exquisite; always obtund.	Not particularly sensitive.	Sometimes very sensitive, sometimes not.
VITAL FORCE.	Quick of response, either in a recuperative or adverse direction.	High grade.	(Good in young, active life, but decreases in old age, owing to lymphatic.	Spasmodically recuperative; unreliable.
INFLAMMATORY CONSIDERATIONS.	Slight irritation produces quick response; tissues are resistant and recuperative.	Slight irritation produces high-grade inflammation, requiring decided and persistent antiphlogistic treatment.	The tendency of this temperament is toward the establishment of chronic inflammatory conditions.	Slight irritation produces serious inflammatory complications; response is quick to irritation and medication.
CONSERVATION OF PULP.	If physical condition is good and pulp exposed, may cap; if not good, devitalize; when capped, pulp will give prompt evidence of success or failure; in deep decay the horny dentine should be conserved and intermediates used.	If exposed, use persistently the most decided pain-obtunding, antiphlogistic and protective treatment locally, together with medication systemically; success is doubtful; in deep decay intermediates must be used.	When exposed, if physical condition is good, a fair chance of success exists, but when pulp has been markedly irritated failure will probably result; in deep decay conserve all dentine possible and use intermediates.	Treat as in sanguo-lymphatic, but with less chance of success.
TREATMENT IN PERIODONTITIS.	Remove cause, preclude irritation, sequester locally, and, if indicated, sequester systemically.	Same as in nervo-bilious.	Remove cause, preclude irritation, apply persistently sedating and constricting applications (aconite with iodine spots).	Treat for third fourth or fifth-grade periodontitis, according to indications. (See Periodontitis.)
GENERAL PERCEPTIVITY OF PAIN.	Markedly perceptive of pain, but tolerant of necessary infliction.	Very perceptive of pain and intolerant of any infliction.	Tolerant of infliction.	As a rule very perceptive of pain.
CONSIDERATIONS PERTAINING TO FILLING.	Gold lasts well on articulating faces; in approximal cavities lasts as a rule from 5 to 8 years; plastics are indicated, especially gutta-percha.	Gold is an excellent filling material, if the necessary pressure is tolerated; if not tolerated, plastics are indicated.	Gold often lasts fairly well, but amalgam in lined and unlined cavities seems especially indicated.	Use plastics or line for gold.
GENERAL CHARACTERISTICS OF TEMPERAMENT.	Perception and tact; fluency of speech and sprightly, pleasing manner; decided in likes and dislikes; outspoken in commendation or disapprobation; eminently executive.	Beauty of person; warmth of feeling; keenness of perception; promptness and activity of endeavor; impatience and fretfulness under irritation; impulsiveness and generosity even to imprudence.	Lymphatic bulk, modified by sanguine hopefulness and nutrition, giving ease, satisfaction and kindheartedness; lacks quick perception and solid strength (pulp same); the lymphatic increases with age, hence pulps not so amenable to treatment after middle life.	Nervous, quickness of perception and response to irritation modified by bilious strength (conditions).
SPECIAL SENSES.	Acute.	Acute.	Average.	Exceedingly acute; not reliable.

CHARACTERISTICS OF DENTAL TEMPERAMENTS (339).

INDICATIONS.	SANGUO-NERVOUS.	LYMPHATICO-NERVOUS.	BILIO-LYMPHATIC.	NERVO LYMPHATIC.
SIZE AND GENERAL FORM.	Less than average size; decidedly less than average osseous, muscular and contour development; waist small and delicate.	Average size; less than average osseous and muscular, but more than average contour development.	Decidedly more than average size with largeness of development; neither beauty of form nor strength of structure.	Average size; usually of average development, without beauty of form or face.
COMPLEXION AND SKIN.	Fair and smooth, with fine color tints.	Dark or light, but generally devoid of freshness and color, especially in young life.	Dark, pallid and opaque.	Light; pallid; deficient in quality.
CONTOUR OF HEAD AND FACE.	Cheeks high and prominent; forehead high, full and broad in proportion to rest of the face; lower face inclined to thin; chin small and round.	Cheeks inclined to full, but flat and not firm; forehead broad and high; jaws average; chin small and well formed.	Cheeks large, but not prominent; forehead large, but unexpressive; jaws large and round; chin large and round.	Cheeks full and somewhat prominent; forehead good and usually high; jaws average; chin average and round.
HAIR.	Light and curly; of fine quality, with decided inclination to baldness; beard scanty; but pleasing, both in quality and length; eyebrows light and arched.	Medium in color, but straight, or, at most, slightly wavy; eyebrows not marked nor arched; beard sometimes almost wanting.	Dark, moist and straight; generally in good quantity, but lacking in quality; eyebrows marked; beard moderately heavy, dark and straight.	Straight and medium in color; eyebrows marked and arched; beard straight and of medium quantity and quality.
EYES.	Blue or gray; full; inclined to large and expressive.	From dark gray to light gray. (Modification of this temperament will sometimes produce the apparent anomalies of dark hair with very light eyes and of light, flaxen hair with very black and pleasing eyes.)	Dark gray to quite dark; moderately large, but wanting in expression and power.	Grayish, inclining either to green or hazel; of medium size, but possessed of a quick, restless motion, with anxious and suspicious look.
NOSE.	Thin, prominent and shapely.	Average; somewhat decided in contour.	Shapely.	Average; not decided in contour.
MOUTH AND LIPS.	Mouth average; lips full.	Mouth large; lips full, quick of motion, but lacking firmness.	Mouth large; lips full, and bluish or brownish pink in color.	Mouth average; lips usually shapely.
COLOR OF TEETH.	Bluish-cream color.	Grayish blue.	Yellowish in color; of good polish, but of suspicious opacity.	Cream color.
SIZE AND SHAPE OF TEETH.	Average size; of good shape; inclined to long; have rather narrow necks.	Average size and shapely.	Large and bulky.	Average size; good shape; neither long nor short.
STRUCTURE OF TEETH.	Tooth structure fair; fairly firm in jaw.	Enamel and dentine soft; fairly planted in jaw.	Almost worthless; loosely planted in jaw.	Soft and almost hopelessly worthless; fairly planted in jaw.

DECAY OF TEETH.	Either limited and circumscribed or almost unlimited and extended.	Very rapid; very liable to irritation of pulp.	Extended, asthenic decay.	Soft, rapid decay.
STYLE OF ARCH.	Narrow and rounded anteriorly.	Rounded.	Broad and flat.	Rounded.
SENSITIVITY OF DENTINE.	Usually sensitive; sometimes exquisitely so.	Sometimes quite sensitive.	Not particularly sensitive.	Either excessively sensitive or devoid of sensitivity.
VITAL FORCE.	Fair; is largely drawn upon through the sanguine, in many cases collapse resulting.	But little vitality is possessed by this temperament to give support to treatment.	Below average.	Below average.
INFLAMMATORY CONSIDERATIONS.	The tissues are quick of response to irritation.	Tendency to acute inflammation.	A slight irritation may produce grave lesions.	A slight irritation is liable to produce grave lesions.
CONSERVATION OF PULP.	Treat as in sanguo-lymphatic, but with much less chance of success.	If exposed, devitalize; in deep decay treat as for exposed pulp of lymphatico-sanguine; success doubtful.	Treat as for lymphatico-nervous.	Treat as for lymphatico-nervous.
TREATMENT IN PERIODONTITIS.	Treat as for third or fourth grade.	Treat as for third or fourth grade.	Treat as for third, fourth and sometimes fifth grade.	Treat as for third, fourth and fifth-grade periodontitis, according to indications.
GENERAL PERCEPTIVITY OF PAIN.	Very perceptive, but somewhat tolerant of pain.	Usually perceptive, but occasionally tolerant.	Below average.	Perceptive of pain.
CONSIDERATIONS PERTAINING TO FILLING	For accessible circumscribed cavities gold is admissible; for inaccessible cavities of extended decay utilize plastics.	Use plastics with great care.	Use plastics only, with great care and frequent renewal of fillings; teeth of this temperament are very hard to save, even with this treatment.	Same as in bilio-lymphatic.
GENERAL CHARACTERISTICS OF TEMPERAMENT.	Quickness, acuteness, restlessness, hopefulness, without endurance or strength.	Nervous quickness, modified by lymphatic slowness and bulk, giving lack of solidity to tissues and teeth; sharp, quick, jovial manner; apparent quickness of perception, but without reliability or firmness of decision; voice often squeaky.	"Weakness trying to be strong; vacillation trying to be decided; softness trying to be solid; inertia trying to be momentum."	Lymphatic bulk and softness, dominated by unreliable nervous irritability; marked suspicion of kindness and credulity of impression; prone to misapprehend, misconstrue and misrepresent; quick, restless manner.
SPECIAL SENSES.	Acute.	Apparently acute, but really devoid of correctness of perception.	Below average.	Below average.

340. In what manner does physical condition influence pulp conservation?

Good temperaments, with poor physical condition (such as typhoid conditions), respond but slowly to medication, while good physical condition, even in poor temperaments, assists largely in producing satisfactory results.

341. How does over-exertion act upon it?

Over-exertion impairs physical condition. Exertion which produces a more or less continuous state of fatigue will be more or less detrimental to the recuperation of a pulp.

342. Sex. What circumstances in the male act adversely?

Greater exposure and more violent exertion than in the female.

343. What in the female?

Pregnancy, abnormal menses and other uterine complications. (See 168.)

344. In what manner does occupation influence it?

By causing over-exertion or enforcing positions which carry the blood to the head. Sedentary employment, poor ventilation, imperfect drainage (causing noxious gases), changes of temperature, the mental anxiety connected with occupation, or anything which lowers the general vital force, diminishes the probability of pulp conservation.

345. How does mode of living act, beneficially or prejudicially?

This acts upon physical condition in proportion as it is strengthening or weakening, soothing or irritating, luxurious and healthful or penurious and unwholesome, nutritious or a mere pandering to the appetite.

346. What is taught regarding the influence of location or place of residence?

Residence in malarial places has a decidedly adverse influence upon the general health, consequently upon pulp conservation. Pulp capped in healthy localities often give serious trouble and sometimes die when removed to unhealthy places.

347. How should such cases be treated when the patient is visiting only?

Unless very pronounced, soothe the pulp till patient can return to the healthy locality.

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348. What constitutional support is recommended in such cases as have adynamic complications?

Mild gentian or quassia, boneset, nitro-muriatic acid alone or in combination with antiperiodics.

349. What is taught regarding thermal influences, either local or general?

Local applications of hot or cold shock pulps in proportion to loss of protecting dentine, unless non-conducting intermediates or filling materials be used. Sudden changes of warm and cool temperature conduce to colds, congestions, fluxes and inflammations. These changes, together with continual exposure to heat or the shock of cold baths, may produce systemic effects adverse to conservation of pulps.

350. How do barometric changes influence pulp conservation?

Barometric changes are, as a rule, exciting and may cause much irritation. In this climate March and November are unfavorable months for conservative treatment, because of frequent and decided thermometric and barometric changes.

351. What is the *third* cause of odontalgia?

Irritation of the dental pulp from almost complete or complete exposure and from dying pulp.

352. What are the symptoms?

Paroxysmal and remittent or intermittent pain, but not periodic; not always positively located; very severe during paroxysms; throbbing or jumping; great exacerbation from *thermal*, *vital* or *mechanical* irritation; greater at times, generally during the night or while in recumbent position; no increase of pain from pressure upon tooth, but sometimes upon tapping, due to concussion. (See 310 to 315.)

353. What does periodicity of the pain indicate?

Malarial or other endemic complications.

354. What are the six heads under which liability to irritation prior to filling are discussed?

1st, infiltration of salt, sweet and sour condiments (the most usual); 2d, direct contact with foreign bodies; 3d, pressure of foreign material; 4th, thermal irritation from even slight deviations of temperature; 5th, mechanical irritation during excavating, etc.; 6th, medicinal applications. (See 395.)

355. What is the first and most important knowledge needed for diagnosing an almost exposed or exposed pulp?

Accurate knowledge of location, size and shape of pulp cavity.

356. What is taught in regard to the pulp cavity being a miniature of the crown of the tooth?

That it is so only in a general way, not sufficiently so for accurate practice, fine cornua being found in blunt cusps and cornua of different lengths in cusps of nearly equal length.

357. What is taught in regard to the relative position of the pulp cavities in teeth in the hand and teeth in the mouth?

The position of teeth in the jaw is never that upright one given in diagrams or which is usual in manual examinations. In the superior teeth the crowns slant outwardly, while in the lower teeth they slant inwardly. These positions must be studied in the mouth before practical application of this knowledge can be made.

358. What four considerations obtain in relating cavities of decay with exposure of pulps?

1st, *situation* of cavity of decay; 2d, *depth* of cavity; 3d, *direction* of cavity; 4th, *character* of caries.

359. What is taught in regard to depth of cavity?

This does not refer to actual depth, but to nearness of bottom of cavity to the pulp.

360. What of the character of caries?

In proportion as the decay is of the rapid variety is exposure probable.

361. What are the four means of diagnosing almost exposed or exposed pulps?

1st, visual test; 2d, pressure test; 3d, thermal test; 4th, taxis.

362. How is the visual test made?

Either by direct observation or by reflection with the mouth-mirror, the cavity being properly cleansed and dried.

363. How should the mouth-mirror be prepared?

Warmed carefully over the flame of a spirit-lamp, or by dipping into warm water, or by resting for a moment flat upon the tongue.

364. What is the appearance of the dentine overlying an almost exposed pulp?

Varying from altered shade of dentine and varied pink or red, even to dark shades of blue or brown.

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365. What is the appearance of an absolutely exposed pulp?

The peculiar "orifice" appearance of even a needle-point exposure requires to be seen but few times to insure ready recognition.

366. How is the pressure test made?

By pressure with a pellet of cotton in the direction of the suspected exposure.

367. How is pain from sensitive dentine to be distinguished from pulp irritation?

The former stops on cessation of pressure, and is usually felt about the periphery of the cavity; the latter usually continues for a short space of time after the irritant is withdrawn, and is felt in the location of the pulp cavity.

368. How is the thermal test made?

By placing *one* drop of cold water against the side of the cavity and allowing it to run upon the pulp; if no response is given, more cold water may be cautiously injected.

369. How is "taxis" performed?

By very gently and cautiously touching the pulp with an untempered probe, guarding against nod of patient by pressing the thumb of left hand against upper teeth.

370. What would be liable to produce nod of patient?

Affirmative response to question regarding pain.

371. If no response be given by pulp upon taxis, what is the indication?

Death of at least the bulbous portion of the pulp.

372. What medicaments are recommended for the soothing of almost exposed or exposed pulps?

Tincture of benzoin, laudanum, spirits of camphor, phénol sodique, oil of cloves, oil of cinnamon, fluid extract of piscidia erythrina, hydrate of chloral, eugenol, thymol, oil of cajeput, oil of eucalyptus, creasote or carbolic acid (only when intending to devitalize), acetate of morphia paste, menthol, muriate of cocaine, dental tincture of aconite, iodoform paste.

PULP CAPPING.

373. What is pulp capping?

The placing of a protection for the conservation of an exposed or practically exposed pulp requiring more than an intermediate.

374. What are the first considerations?

Whether indications are favorable or unfavorable to the effort of pulp conservation.

375. What are taught as the governing influences in pulp conservation, good material for capping and proper manipulation conceded?

Condition of pulp, temperament, age and physical condition decide the *grade* of help to be afforded to a pulp. (See 339.)

376. What are the seven desirable attributes for capping material, named in their order of importance?

Non-conductivity, non-irritating quality, porosity, soothing or healing quality, plasticity, resisting capability, durability.

377. Of what importance is porosity?

It absorbs the serum which oozes from the pulp, even through dentine. It is imperatively demanded when lymphatic or adynamic complications exist.

378. What is the advantage of plasticity? Of durability?

Plasticity enables easy placing, with subsequent hardening, without irritation of pulp. Durability gives comparative permanency to a capper in case of confluent decay or fracture of tooth substance.

379. Name a few materials which are used as pulp-cappers.

Oxysulphate of zinc, plaster of Paris, oil of cloves pad, hydrated oxychloride of zinc, varnishes, solutions of gutta-percha, medicated pastes under concave plates (Weston's caps), thin lead plate, tea-chest lead.

380. What is taught regarding gutta-percha as a capper?

It is one of the *standard* applications; should be used in chloroform or benzole solutions, either dropped upon the pulp or applied under concave plate. It possesses all the qualities except those of porosity and healing quality.

381. What is taught of oxysulphate of zinc?

It is an excellent capper, and is reasonably accredited with therapeutic as well as protective value.

382. What is taught of plaster of Paris?

It possesses all the attributes except that of durability. The cavity should be filled with the quick-setting plaster; when hard, this should be cut out to desired depth.

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383. How is the oil of cloves pad made?

By making a paste of oxide of zinc and oil of cloves, and applying as a first layer under oxychloride of zinc.

384. What is taught of oxychloride of zinc?

That its claims as an excellent conserver of pulps have not been positively proven, and that while it has many good points, and may sometimes produce just sufficient irritation of pulp to result in good, yet its known irritating power and its doubtful clinical record render it safer to reject it for this special purpose.

385. Does oxychloride possess the power of mummifying pulps which die under it?

It does not possess such power, though pulps *may* mummify under it.

386. What is taught of hydrated oxychloride of zinc as a capper?

It is regarded as a good capper.

387. What is taught of the zinc phosphates as cappers?

Their use in this connection is decidedly questionable. Though not absolutely so proven, the phosphoric acid they contain is supposed to have a devitalizing power over the pulp. (See 251.)

388. How is lead plate to be used?

Cut to proper size; with handle end of an excavator make it concavo-convex; make hole in centre to allow for escape of surplus medicament; fill concavity with soothing medicaments and apply over point of exposure.

389. What length of time is taught as "probationary" prior to deciding whether efforts at pulp conservation are likely to be successful?

From six months to a year.

390. Is this length of time universally reliable?

It is not; for pulps may give symptoms of failure in less time and may not do so for years.

391. What length of time should elapse before success may be pronounced?

At least from five to seven years.

392. What is taught regarding teeth the pulps of which die lingering deaths?

The pathological condition induced by slow death of the pulp is one of such chronic alteration of nutrition as to render liable,

upon slight irritation, serious and frequently uncontrollable peridental trouble, resulting in comparatively early death of the peridentium, necrosis of the root and loss of the tooth. Quick devitalization permits of a more perfect return to normality. (See 618.)

393. What is taught regarding efforts at conservation of pulps?

That the value of the living pulp is exceedingly great, giving to its tooth almost every chance of future *permanent* usefulness, in place of the almost positive certainty of future liability to trouble, *eventuating* in the loss of the tooth; therefore it is not only warrantable, but professionally imperative, that every effort should be made for the preservation of pulp vitality.

394. What three considerations contra-indicate efforts at pulp conservation?

1st, decidedly marked pulp irritation, evidenced by several severe attacks of paroxysmal pain, in connection with a probable future of pain without possibility of relief; 2d, in cases where systemic condition is decidedly adverse to probability of success, and where the suffering from *chronic* disease is such that additional pain would be decidedly detrimental; 3d, in cases where immediate immunity from all possibility of subsequent suffering is shown to be a necessity, from business or other important considerations.

395. What are the external causes of irritation to pulp other than the six already mentioned? (See 354.)

Prevention of exudation by filling; loss of tooth substance from attrition; fracture of tooth; disease of the surrounding parts.

396. What is the internal cause?

Pulp nodules.

397. What are the five considerations in connection with pulp irritation from disease of the surrounding parts?

Salivary calculus; tartar; looseness of tooth; abscess; atrophy or absorption of either gum, alveolar process or roots.

398. How is pulp irritation from loss of tooth substance by attrition distinguished from sensitive dentine?

Sensitive dentine causes unlocalized uneasiness, which does not increase to paroxysms. (See 184.) The irritated pulp gives localized and paroxysmal pain. (See 298 and 352.)

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399. What instrument is used in the diagnosis of pulp exposure in cases largely abraded?

A probe, blunted in order to avoid plunging through the thin covering of dentine.

400. What is usually the best method of remedying irritation of the pulp from loss of tooth substance?

The grinding off of the occluding tooth, together with the building up of articulating fillings upon three or four not unduly worn antagonizing teeth, in order to preclude or retard further abrasion.

401. What condition is sometimes found analogous to a loss of tooth substance by attrition and eventuating in the same symptoms?

Marked clean *cupping* occurring on the cutting edges, cusps and articulating faces of the teeth, such cavities presenting a smooth, defined and clean appearance.

402. To what is this due?

It is regarded as due not entirely to mastication, but to be a peculiar phase of dental caries, which disintegrates the dentine prior to the action of mastication.

403. How is this condition treated?

By preparation of cavity and filling, as in ordinary decay.

404. Upon what four causes is fracture of the tooth dependent?

1st, impingement upon *hard* substances, as bone, shells, shot or candy; 2d, impingement upon only *moderately hard* substances, when extensive decay has left frail walls; 3d, blows or falls; 4th (very unusual), congestion of pulp. The symptoms of this are: Fullness within tooth, rapidly passing into extreme tension and pain, or into tense numbness and growing uneasiness. When the fracture occurs, a noise like a pistol-shot is sometimes heard *by patient*.

ABSORPTION OF PERMANENT ROOTS.

405. What are the signs and symptoms of absorption of permanent roots? Its treatment?

Absence of discoloration of tooth; neuralgic pain; tenderness of cheek to pressure; pain in the eye, with amaurotic and possibly circulatory complications (sometimes suffused cornea and conjunctiva); decided *response* upon tapping; sometimes pricking

sensation on pressure (from spiculated condition of root): great pain from *decided* hot or cold applications; general sense of uneasiness about jaw, directly referable to the tooth: *almost universally undefinable, but positive conviction on the part of patient that removal of tooth would insure relief*. Such teeth are dense in structure and very firmly set in their sockets. Treatment—Extraction.

PULP NODULES.

406. What is “nodular calcification?”

The formation within the pulp of granular, lobular, kidney-shaped or spicular deposits of calcific matter, generally confined to body of pulp, though sometimes found in the canals. (See 396.)

407. What are the signs and symptoms of pulp nodules?

Continued or intermittent pain, commencing without known irritant, and rapidly increasing in violence until unendurable; no periodicity, unless under malarial influence systemically; *sometimes slight external inflammation*, but generally health line is normal; peculiar sensitiveness of enamel on scratching it; exquisite sensibility of dentine, increasing upon drilling.

408. How is diagnosis of this condition made?

By differentiation.

409. In making diagnosis of pulp nodules, what influence has temperament and physical condition?

Pulp nodules are usually found in connection with good physical condition and high-grade temperaments of sthenic attributes.

410. What is the method pursued in devitalizing such pulps?

Preliminary treatment, systemically—Asafoetida pills and solution of bimeconate of morphia. Locally—Application, *by operator only*, of aconitia ointment, followed by veratria ointment, if indicated, over the eyes, upon the temples, sides of nose and upon the cheeks (about and below infra-orbital foramen), *avoiding eyes*; use powerful obtundents for the hypersensitive dentine, as chloride of zinc, chromic acid, arsenious oxide or electricity; approach pulp cautiously, avoiding irritation; soothe pulp irritation if any; apply arsenic; make steady advances into pulp canals, with least possible irritation, using in them combinations of acetate of morphia paste, muriate of cocaine, menthol and dental

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tincture of aconite, in conjunction with arsenious oxide; no haste should be made; when tooth is quiet, allow it to so remain for weeks if needs be.

411. What is taught in regard to complete extraction in cases of pulp nodules and absorption of permanent roots?

Every portion of root must be extracted, else little, if any, relief will be afforded.

412. What is the method of extracting such roots as are broken off?

Fissure-drill around root, using cocaine applications or dental helix as obtundent, and lift out with thumb-forceps.

413. What is "phantom odontalgia?"

A pain which recurs at intervals after extraction, resembling the pain experienced previous to extraction. It is caused by extraction of tooth during a period of intense irritation of external filament of nerve leading to pulp.

414. What is the best method of preventing this?

To absolutely quiet pulp for twenty-four hours and then extract; then make application of acetate of morphia paste (with cocaine and menthol) in alveolus, precluding irritation by guard if necessary.

FUNGOUS GUM AND FUNGOUS PULP.

415. What is fungous gum and fungous pulp?

A benignant hypertrophied condition of gum or pulp.

416. How is a fungous growth of gum within a tooth diagnosed from that of fungous pulp?

This cannot be done except by treatment.

417. What is the treatment?

Soothing, constringing, sorbefacient. Gradually press aside with cotton medicated with acetate of morphia or dental iodine until diagnosis can be made as to whether the growth is an ingrowing gum fungus or a pulp fungus.

418. What indicates fungous pulp?

The fact that the growth does not arise from a cavity or perforation, but from a pulp canal.

419. What is taught regarding color as a diagnostic sign?

Fungous gum and fungous pulp are alike in color, from light pink to dark purple; color is, therefore, not a diagnostic.

420. What is taught regarding sensitivity as a diagnostic symptom?

Fungous gums and fungous pulps may be either exquisitely sensitive or devoid of sensitivity; therefore sensitivity is no diagnostic.

421. What is taught of applying arsenic at once?

Never apply at once; because, if the fungous growth is hypertrophied gum, the arsenical impress will be given to the tissues outside of the tooth.

422. What is a perforation?

A cavity, excavation or drill-hole perforating the cementum.

423. How is it treated?

Moisten cotton-wool with oil of cloves or fluid cosmoline and press gently into cavity; impinge upon outside tissue just sufficiently to permit accurate contour healing; this accomplished, gently dry cavity with absorbent cotton, place smooth pieces of low-heat white gutta-percha (warmed) over orifice, and secure in position. A drill-hole should be enlarged inwardly to a conical shape for obvious reasons. (See *Plastics and Plastic Fillings*, p. 138.)

COMPLICATED CARIES.

424. What is complicated caries?

That stage of decay which requires for its proper treatment pulp cavity and canal work.

425. Is a pulpless tooth a dead tooth?

No; because the cementum and pericementum are still vital; the enamel and dentine only are devoid of nourishment. (See 114.)

426. Why is the dentine dead?

Because the pulp is the source of its nutrition, and the pulp is dead.

427. What, then, constitutes a dead tooth?

One the pulp and pericementum of which no longer perform their functions.

428. What is the natural result of such a condition?

Exfoliation.

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429. Is a dead tooth ever tolerated in the jaw?

Occasionally; in such cases it may usually be left until indications point to its removal.

430. What are such indications?

Unbearable annoyance, irremediable elongation, unsightly discoloration, injurious pus formation, caries or necrosis of contiguous parts.

431. What natural results may follow the death of a pulp?

Loss of vital resistance, translucency, nutrition and sensation of dentine. (See 113.)

432. What untoward results may follow the death of a pulp?

Discoloration of tooth, periodontitis, alveolar abscess, necrosis of root and caries, or necrosis of surrounding process, with their probable attendant neuralgic complications. (See 714.)

433. What is the cause of loss of translucency?

A disorganization of the contents of the dentinal tubuli.

434. What is the cause of discoloration?

Infiltration of tooth tissue by external or internal discoloring material.

435. Is it possible to remove this discoloration?

Not always; sometimes by excavating the discolored dentine, or whitening with prepared chalk and lining with oxychloride or oxyphosphate of zinc, a reasonable restoration of color may be made; but frequently, with the use of all means, discoloration may recur.

436. What two remedies present to this condition of final discoloration?

1st, pivoting or crowning; 2d, extraction and replacement by artificial substitute.

437. What is taught of bleaching?

It is of doubtful value, the darkness frequently returning worse than before.

438. Is a tooth ever better when pulpless than when fully vital?

Yes; the value of a pulp diminishes in proportion as the pabulum which it distributes is of poor quality. In such teeth fillings often prove more durable after devitalization; the tooth is, however, liable to the diseases which follow devitalization.

DEVITALIZATION OF DENTAL PULP.

439. What are the four means of devitalizing a pulp?

1st, cauterization; 2d, instrumentation; 3d, partial luxation; 4th, appropriate medicament.

440. What is actual cauterization?

It consists in heating a fine wire to a white heat and plunging it into the pulp (obsolete), or in the appropriate use of the electrical cautery.

441. What is potential cauterization?

The application of nitrate of silver, caustic potash or Vienna caustic (quicklime and caustic potash, equal parts, made into a paste with alcohol). (Methods obsolete.)

442. What is instrumentation?

1st, broaching—the act of quickly, piercing, twisting and extirpating by means of smooth or barbed broaches (admissible only in centrals and cuspids); 2d, puncturing—the act of puncturing acetate of morphia paste, muriate of cocaine, dental tincture of aconite or arsenious oxide paste into a pulp by means of gradual and repeated thrusts with an exceedingly fine puncture-probe prior to extirpation. Care must be taken not to pass through apical foramen.

443. What is luxation?

A partial extraction of the tooth, by means of which external connection with pulp is severed and devitalization follows. It is then to be gradually returned into place and properly guarded against irritation from occlusion.

444. What is meant by devitalization with appropriate medicament?

The use of some medicament which shall either kill the pulp through its own impress or so obtund it that pressure may accomplish the desired end.

445. What is an impress?

In this connection it means the production of a dynamic vital irritation. (See 89.)

446. What is arsenious oxide?

An oxide of the metal arsenic, obtained from Bohemia and Saxony during the smelting of cobalt ores; also obtained by

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roasting the arsenical sulphide of iron, which oxidizes, forming arsenious oxide (As_2O_3); this is then resublimed. (See Pharmacopœia.)

447. What are the tests for adulteration of arsenic?

1st, by subliming on metal plate; residuum indicates impurity;
2d, blow-pipe test gives odor of garlic, indicating arsenic.

448. Name the principal tests for the presence of arsenic.

The ammoniacal nitrate of silver test, Marsh's test, Reinsch's test.

449. Which test is usually employed in dentistry?

Reinsch's test. (See any work on Chemistry.)

450. What are the characteristics of arsenious oxide?

Sublimes at 425° Fahr.; condenses into octahedral crystals; has no smell except when burned; has a faint, sweetish taste; sparingly soluble in cold water; largely soluble in boiling water; very soluble in alkaline solutions and in hydrochloric acid; is not at all soluble in creasote, oily carbolic acid or oil of cloves; forms compounds of arsenites.

451. When and by whom was arsenic introduced into dental practice?

Introduced by Dr. John R. Spooner, of Montreal, and made known to the profession in 1836 by his brother, Dr. S. Spooner.

452. Why is arsenic called a dynamic vital irritant?

Because of the very small quantity necessary to produce such decided impress and such extended devitalization of tissue.

453. What experiments prove this?

A large frog may be killed and preserved from putrescence by the persistent application of one-twenty-fifth of a grain of arsenic to its leg; arsenic may then be found in every portion of its body.

454. What action has arsenic internally?

Tonic, antiperiodic, pulmonic, detergent, escharotic or a vital irritant poison, according to the size of the dose.

455. What is a tonic dose?

One-twentieth to one-tenth of a grain three times a day.

456. What is the quantity used in pulp devitalization?

One-fiftieth to one-twenty-fifth of a grain.

457. What, then, in case of the loosening of an arsenical application, are the safest things that can happen?

1st, ejection from the mouth; 2d, swallowing (tonic).

458. Do arsenical applications ever act injuriously systemically through the pulp?

Yes; in rare but seemingly well authenticated cases symptoms of systemic arsenical poisoning from *pulp devitalization* have occurred without perceptible local irritation.

459. What action has arsenic on the dental pulp?

It is a dynamic vital irritant only. (See 454.)

460. What action has it on gum tissue?

It is a sure cause of death of the part unless removed. (See 453.)

461. When arsenic destroys the gum, what is the appearance of the part?

The usual darkened, discolored and turgid appearance of sloughing tissue.

462. What is the remedy for this condition?

Scraping or burring out the darkened and softened parts until tissue capable of healthy granulation is reached; dress with styp-tic cotton and soothing, healing medicaments, as tincture of calendula or phénol sodique.

463. In what forms is arsenic used?

In powdered form; in pastes; in devitalizing fibre. (See Medicaments.)

464. What four considerations govern the application of arsenic to a pulp?

1st, proper preparation for application; 2d, proper placing of medicament; 3d, proper guarding against danger to gums, tongue, lips and cheeks; 4th, proper maintenance in position.

465. What of proper preparation?

Leave all edges possible; syringe cavity with warm water; excavate painlessly to a concavity; gently enlarge, if possible, the orifice of pulp exposure; stop pain, if aching, that pulp may be quiet when the arsenical impress is made.

466. Why is it improper to apply arsenic to an inflamed pulp?

Because its inflamed condition prevents the induction of the proper impression.

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467. What is the effect of arsenic, when applied, upon a partially devitalized pulp?

It is probable that no effect would be produced.

468. What of proper placing?

Place accurately by cotton or probe *on* the pulp in such temperaments as have dominating bilious or lymphatic attributes, and *near* the pulp in such temperaments as have dominating nervous or sanguine attributes. Be careful not to get arsenic on gum; apply obtundents on a separate pellet of cotton.

469. How is arsenic applied by puncture?

By puncturing with a sharp probe directly into the bulbous portion of the pulp or larger portions of canals.

470. What is the danger in arsenical applications?

The escape of arsenic from the cavity.

471. Where is devitalizing fibre used?

In cases where danger exists to gum tissue or where only shallow "pockets" are obtainable.

472. What is a pocket?

A hole drilled into a tooth in the direction of, and as near as possible to, the pulp, in which arsenic is applied for the purpose of devitalization. It is usually made in such a position that it may be enlarged into a tap-hole?

473. When are pockets especially indicated?

When cavities of exposure are so situated as to forbid proper ingress to pulp canals, and especially if they impinge upon cementum.

474. What is taught of proper guarding?

As the cervical portion of the tooth is reached the danger from leakage increases.

475. What precedes an arsenical application in approximal cavities?

The pressing against the gum, between the teeth, of an elongated pellet of cotton saturated with oily carbolic acid.

476. What three purposes does this subserve?

1st, mechanically presses gum away from the cavity; 2d, offers a mechanical and medicinal barrier to the passage of arsenic (see 450); 3d, eschars the mucous membrane. Arsenic will not pass through dead tissue.

477. How should an approximal cavity opposite to that in which an arsenical application is to be made be guarded from the arsenic?

By filling it either permanently or with temporary stopping.

478. How should the cheek or lip be guarded in cases of ligated arsenical applications in shallow buccal or labial cavities?

By ligating over the application, rubber dam or rubber cloth, or by placing between the application and the cheek or lip muslin or rubber-cloth shield or compress; allow the application to remain a short time only (an hour or two), until sensitivity is obtunded; then make a securely-covered application.

479. What are the methods of maintaining in position an arsenical application?

1st, by cotton and oily carbolie acid, secured with sandarac or mastic varnish; 2d, by temporary stopping; 3d, by oxyphosphate or nitro-phosphate of zinc; 4th, by "facing" amalgam. Method No. 1 is used when depth of cavity and retaining periphery permit. Temporary stopping may cover applications of long duration and be used in cavities too shallow to permit the use of cotton; it is non-leaking. Methods Nos. 3 and 4 are to be used over applications of long duration, in connection with marked exposure to attrition; unlike all other plastic filling materials, they are non-leaking.

480. What length of time is *needful* and *possible* for arsenical applications?

From three or five hours to one or more weeks is usually needful, but it is possible that arsenic may remain until, from *pulp putrescence*, periodontal irritation is induced.

481. Why is it ever left thus long?

That the most complete devitalization may permit the most painless extirpation.

482. If arsenic be sealed in the pulp cavity of a perfectly developed tooth, will it pass through dentine and cementum?

It will not.

483. Why is this the case, when arsenic will pass through dentine and affect the pulp?

Dead dentine will prevent its passing to cementum, while *living* dentine will insure its passage to the pulp.

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484. How is arsenic introduced into the pulp tissue?

Through the medium of the circulation.

485. What is usually the first effect of an arsenical application upon a pulp?

It produces "determination" of blood, with its concomitant pain and throbbing.

486. If the irritation cannot be carried beyond this point what is to be done?

Remove application, syringe, soothe pulp, and renew application. If still the same result, puncture an application into the pulp.

487. What follows "determination"?

"Congestion," with its concomitant fullness and loss of sensation.

488. How does "congestion" devitalize the pulp?

By causing cessation of nutrition.

489. Does "true inflammation" ever ensue?

Sometimes. Indicated by severe paroxysms of throbbing pain, which follow the dull feeling. They are often bearable and will generally pass away in a half hour. This true inflammation adds to the congestion, there being three or four waves of congestion, of about ten minutes each.

490. Does arsenic pass through the apical foramen of a fully-formed tooth?

It does not, unless forced through, because its absorption is interfered with by congestion. (See 78.)

491. What is taught regarding cause and treatment of any periodontal irritation which supervenes upon arsenical devitalization?

Its cause is not directly referable to arsenical irritation, but to the nutrient effusion of "determination" previous to the establishment of new channels of circulation. Treatment—In marked cases apply dental aconite to gum persistently; in sthenic patients also spot with dental iodine.

492. What proofs exist that arsenic is not absorbed by the pulp of a fully-formed tooth?

1st, if absorbed it would preserve the pulp, whereas, as a rule, it putresces in due season; 2d, Reinsch's test, which detects $\frac{1}{250000}$ of a grain, shows no arsenic in the dead pulp.

493. What result in connection with tooth tissue sometimes follows an application of arsenic?

Suffusion—a pinkish or purple discoloration of the crown and neck of the tooth, caused by the infiltration of hæmatin into the dentinal tubuli.

494. What is its treatment?

Open and cleanse canals, stop temporarily above suffusion, wash with tepid water, and leave open to the fluids of the mouth for a few days. Do not use “bleachers.”

495. What governs the repeated applications of arsenic?

In teeth of the upper jaw, even by instrumentation, it is comparatively safe practice, though care must be observed not to force arsenic through the apical foramen. (See 460). In teeth of the lower jaw instrumentation is apt to force the arsenic through; therefore a second application by contiguity (on pellet of cotton) is alone admissible.

496. What is meant by an intractable pulp?

A pulp which it is found impossible under any circumstances to devitalize by arsenical applications.

497. How are such pulps to be treated?

Cover with powerfully-soothing medicaments under concave caps, as attempts at devitalizing by other means usually result in loss of the tooth.

498. How are the pulps of deciduous teeth devitalized?

By inducing such gradual pressure as will be tolerated upon the pulp, by means of cotton pellets medicated with eucalyptus or cajeput (alternates), dental tincture of iodine, creasote, carbolic acid, acetate of morphia paste, muriate of cocaine or oil of cloves. These medicaments permit pressure, which produces congestion, and thereby devitalization of the pulp.

499. Where is pressure indicated?

In deciduous teeth and in such of the permanent teeth as have not fully-formed apical foramina.

500. Why not use arsenic?

It *may be* applied for an hour only, to prepare for pressure, but if left longer it may go through the apical foramen and affect the adjoining tissues.

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501. What carries it through the foramen in these cases ?

The large foramen allows of free circulation and consequent absorption of arsenic. (See 484.)

502. What is the guide to the formation of roots ?

The following table, obtained by a careful observation and comparison of specimens, and which is a reasonably close approximation to a *safe* guide.*

TOOTH.	DECIDUOUS TEETH.		PERMANENT TEETH.
	AGE FULLY CALCIFIED.	AGE DECALCIFICATION COMMENCES.	AGE FULLY CALCIFIED.
Central,	18 to 24 months.	18 to 24 months.	11 years.
Lateral,	24 " "	24 " "	11 " "
Cuspid,	4 to 5 years.	6 to 7 years.	17 to 18 " "
First bicuspid,†	—	—	17 to 20 " "
Second bicuspid,†	—	—	17 to 20 " "
First molar, . .	3 to 4 years.	7 to 8 years.	12 to 14 " "
Second molar, .	5 " "	8 to 9 " "	20 " "
Third molar, . .	—	—	As variable as the eruption.

503. What are the six considerations which maintain *systematic antagonism* in the treatment of deciduous and permanent teeth ?

- | | |
|--|---|
| <ol style="list-style-type: none"> 1. Deciduous teeth are for temporary use. 2. Deciduous teeth are filled for temporary purposes. 3. Deciduous roots are absorbing or absorbed when the crowns need attention. 4. Irritation of pulps interferes with absorption of deciduous roots. 5. Devitalization of pulps prevents absorption of deciduous roots. 6. Every consideration points to the early loss of rootless deciduous crowns. | <ol style="list-style-type: none"> 1. Permanent teeth are for permanent use. 2. Permanent teeth are filled for permanent purposes. 3. Permanent roots are usually not fully formed when the crowns need attention. 4. Irritation of pulps interferes with formation of permanent roots. 5. Devitalization of pulps prevents formation of permanent roots. 6. Every consideration points to the great utility of even crownless permanent roots. |
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PULSATING PULPS.

504. What is meant by a "pulsating pulp?"

One which visibly pulsates in unison with the arteries.

*In view of the saving of teeth for long-continued future use, the importance of this table cannot be overestimated.

†All the specimens examined indicated the tardy formation of the roots of the bicuspids, both superior and inferior.

505. To what is it probably due ?

Probably due to enlarged apical foramen.

506. What is the prognosis ?

Unfavorable.

507. What symptoms distinguish it from pulp dying ?

Decided pain, long-continued paroxysms of severe suffering, soreness upon pressure, throbbing pain, and imperative demand for relief.

508. What is the condition of the health line ?

Perfectly normal.

509. What is the treatment ?

Careful entrance of tooth, control of probable hemorrhage, sedation of pulp with dental aconite, and careful devitalization, as for deciduous pulps.

EXTIRPATION OF THE DENTAL PULP.

510. Upon what does the average of success resulting from this operation depend ?

Thoroughness of extirpation, favorable auspices, and after-treatment. (See 530.)

511. What are the essentials to thorough pulp extirpation ?

Free openings, affording easy access to pulp canals, either through the cavity of decay or through an opening made intentionally for the purpose of affording such ingress, called a "tap-hole."

512. What is to be done with the cavity of decay in case it does not afford ready ingress to pulp canals ?

Treat it as an ordinary cavity, and fill permanently at once.

513. What is the point for "tap" in each tooth ?

Superior centrals and laterals on lingual face.

" cuspids on tuberosity or disto-labially.

" first or second bicuspid on articulating or buccal face.

" first molars on articulating (best), buccal (next best), or mesial face (fair).

" second molars on articulating, mesio-articulating or bucco-articulating face.

" third molars on mesio-articulating face.

Inferior centrals and laterals on lingual face, just posterior to cutting edge.

" cuspids on disto-labial portion, near the gum.

" bicuspid on mesio-buccal face.

" first, second and third molars on mesial, buccal or mesio-articulating face.

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514. What is the method of tapping?

Spot enamel with diamond or inverted-cone drill, and enter pulp cavity with spear-pointed drill; enlarge this opening with successive sizes of rose drills until the contour lines of the pulp cavity are obliterated: syringe with tepid water.

515. What is the first indication in pulp extirpation?

Probe gently to ascertain as to sensation.

516. What does sensation indicate?

That the pulp is not thoroughly devitalized and that it should be obtunded, or that a second application of arsenic should be punctured into it. (See 469.)

517. What is the danger to broaches in extirpating?

Breaking them off in the canal.

518. What is the objection to leaving a broken broach or probe in the canal?

It presents a mechanical barrier to future venting of the tooth.

519. What methods are recommended for removal of such broken fragment of broach?

If broach is loose, leave common salt in the cavity for a few days, when it can be easily removed, or draw it out by means of a magnetized probe; if tight, bur-drill around broach till end is exposed and lift out with pliers.

520. Give the treatment of canal in single-rooted teeth.

Extirpate as thoroughly as possible; syringe out remaining filaments with tepid water; clean with alcohol and glycerine, and introduce taper-twisted dressings of cotton dipped in fluid cosmoline, not filling the canal flush with the pulp chamber; place a small ball of cotton in the mouth of the canal.

521. What is this called?

The "guard pellet." Its use is to prevent the sudden drawing down of the cotton dressing when drilling near the pulp cavity.

522. Give treatment of canals in multirooted teeth.

Beginning with the largest, extirpate and prepare each in turn. as in single-rooted teeth; the cotton dressings are thus not disturbed nor canals refilled with *débris* during the preparation of smaller canals; as a last thing, prior to temporarily stopping the tooth, work medicament, by means of fine probes, into the smallest canals.

523. What medicaments are recommended for use in fine or tortuous canals where devitalization has been only partial?

Puncture acetate of morphia paste, with or without muriate of cocaine; if this does not satisfactorily obtund the sensitivity, puncture deliquesced chloride of zinc.

524. What medicaments are recommended for ordinary canal-work after recent devitalization?

Fluid cosmoline, combined with menthol, acetate of morphia paste, eugenol, oil of cloves, oil of cajeput, oil of eucalyptus, glycerine, alcohol, inspissated canal dressing, iodoform paste.

525. How long should the tooth remain temporarily stopped?

About a week, or until the irritation about the apical foramen has subsided. (See 491.)

526. What is taught in regard to *hemorrhage* governing this?

Red bleeding is regarded as favorable (except in cases of hemorrhagic diathesis), and is usually followed by coagulation and prompt healing of parts. On the contrary, effusions, or "white bleeding," may take place, enforcing repeated stopping and unstopping before relieved. This occurs generally in patients of the lymphatic temperament. The safest method is to allow time for a thorough devitalization and separation of pulp from outside tissue by sloughing.

527. Is it always possible to clean and fill to the very apex of all roots?

No; fine, tortuous and bayonet-shaped roots often render such operations impossible of accomplishment.

528. Which teeth generally present peculiarities of root formation?

Superior bicuspid sometimes have three roots; superior second molars have usually a flattened root formation; sometimes very fine, hair-like buccal canals, which cannot be even entered; superior third molars have frequently three, sometimes four, occasionally five well-defined roots and canals; lower cuspids occasionally have two roots; inferior first and second molars have often two mesial canals, sometimes a flattened distal canal, and infrequently two distal canals, making four canals to the tooth; sometimes three or four distinct roots; inferior third molars have usually two canals; sometimes three; sometimes three roots; usually more or less curved.

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529. How are the pulps of deciduous teeth to be extirpated?
Partially extirpate and make vent after filling.

530. What are the probabilities of a pulpless tooth?

The probabilities of a pulpless tooth depend upon the temperament, age, sex, occupation and general physical condition of the individual; under favorable auspices the probability of durable usefulness is good; under unfavorable auspices, particularly if complicated with overwork, previous periodontitis or alveolar abscess, the probabilities for continued future usefulness are much decreased.

531. What are the possibilities of a pulpless tooth?

Though all work be properly done, trouble may promptly supervene; while sometimes, even though work be not properly done, long-continued service may result.

532. Which teeth give better promise of success, upper or lower? Why?

The upper. Because of the vitality and cellular character of the surrounding osseous structure, and from the fact that in the lower jaw gravity favors the injurious action of the products of both acute and chronic inflammation, producing recurrent troubles, abscesses, fistulæ, scars and permanent indurations.

EXOSTOSED, FUSED, ATTACHED AND GEMINOUS TEETH.

DENTAL EXOSTOSIS.

533. What is dental exostosis?

A hypertrophied condition of the cementum.

534. What is the cause of this disease?

Any irritation which would continuously stimulate the functional action of the peridental membrane without exceeding its nutrient capabilities.

535. What time is required for its development?

Many months, and usually many years.

536. Through what stages does this disease pass?

Through irritation, thickened peridentium, effusion, coagulation and cartilaginous and cemental organization.

537. What is the appearance of this cemental organization or exostosis?

Sometimes chalky; sometimes moderately dense and yellowish-white; sometimes hard and polished.

538. What is its form?

1st, nodular; 2d, circumscribed or apical; 3d, extended or diffused.

539. What is the condition of the health line in circumscribed or apical exostosis?

Perfectly normal.

540. At what age does exostosis occur?

Usually found upon the teeth of adult and aged persons.

541. What is the relative liability of teeth to exostosis?

Twenty-five per cent. of exostosed teeth are incisors and cuspids; seventy-five per cent are bicuspid and molars.

542. What are the mechanical causes which might produce exostosis?

Any undue mechanical irritation which is possessed of frequency if strong or persistence if weak may, in due time, provoke an exostosed condition. The gentle knocking of the teeth together during thought, the cracking of nuts and other hard substances with the teeth, the biting off of threads, mal-occlusion of teeth, slight protrusion of fillings at cervical margin under the gum, and the slow deposition of tartar under the free edge of the gum are mechanical causes of this disease.

543. Name the vital causes.

Non-occlusion, large metallic plugs, especially large root fillings (from unpleasant conduction of heat and cold), dental caries, alveolar abscess, necrosed roots and other exostosed teeth or roots.

544. What connection has dental caries with this disease?

It is a very frequent cause, and is dependent upon three considerations:

First. Position.—This must be under the free edge of the gum and encroaching upon the roots.

Second. Extent.—These cavities need not necessarily be very large; but if not, should encroach more upon cemental than dental structure.

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Third. Character of Decay.—The slow variety of decay is more likely to produce exostosis than the more rapidly-progressing caries.

545. What are the symptoms of exostosis?

If the pain is localized in immediate proximity to a tooth it is a dull, gnawing, uneasy sensation, referable to the suspected tooth, not absolutely persistent, but remittent or even intermittent, without periodicity, except under malarial influences; paroxysms never acute, but sufficiently severe and lengthy (twelve to fourteen hours) rather than intense; sometimes constant and disagreeable uneasiness, without severity; some peculiar response to pressure and tapping, but not decided; also a peculiar response to thermal changes. The gradual development of the pain is also a diagnostic symptom.

546. What is the range of sympathetic trouble caused by dental exostosis?

Cheekache, jawache, *tic-douloureux*, otalgia, tinnitus aurium, cophosis, ophthalmalgia, amblyopia, amaurosis, cephalalgia, neuralgic pains in distant parts of the body, paralysis (especially of face, arms or hands), and even fits, as catalepsy and epilepsy.

547. What is the medium of association of exostosed teeth with distant parts of the body?

The fifth pair of nerves and its relation sympathetically with the whole economy.

548. What is the treatment for exostosis?

Careful and complete extraction.

549. What is the danger in extraction?

The fracture of the roots from tightening in the alveolus; also of fracture of the jaw and removal of adjoining teeth.

550. What is the method of removing the remnant of the fractured root?

As in absorption of permanent roots. (See 412.)

551. What might be the treatment of exostosis?

Extraction, removal of exostosis and replantation.

552. What is taught of this?

This operation is questionable in proportion as the lesion for which the extraction has been resorted to is severe.

FUSED TEETH.

553. What are fused teeth?

Two or more teeth joined together by a cemental union of their roots, but having an individual and separate pulp for each tooth.

554. What are the causes of fused teeth?

Any cause which will produce exostosis of sufficient extent?

555. What are the symptoms?

The same as those of exostosis, if any.

ATTACHED TEETH.

556. What is the peculiarity of these?

1st, they have separate pulps; 2d, their intervening osseous and membranous tissues mechanically attach their roots in an *apparent* but not *actual* union of cementum and bone.

GEMINOUS TEETH.

557. What is the peculiarity of these?

They have but one pulp.

558. What is the cause of geminous teeth?

The presence of a geminous pulp-germ.

559. What operation in connection with these teeth is improper?

Separation of crowns; inasmuch as the pulp cavity will be opened.

560. What is the relative liability of teeth to gemination?

Mostly centrals and laterals; sometimes a lateral and cuspid; very rarely molars.

PERIODONTITIS.

561. What is periodontitis?

Inflammation located in, or having its inception in, the periodontal membrane.

562. What stages of inflammation does this term include?

All stages, *from* general dental hyperæsthesia, *through* true inflammation, bordering on suppuration.

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563. What is the symptom of general dental hyperæsthesia?

Inability to comfortably masticate food, because of general tenderness or marked sense of uneasiness about the teeth.

564. What are the three causes of this condition?

1st, functional disturbance—either gastric, hepatic or general nervous; 2d, systemic debility (predisposing cause), owing to changes of temperature, mental or physical “worry,” malarial impressions or other depressing influences; 3d, systemic hyperacidity from fruits, acids and the like.

565. What is the treatment advised for the first two?

Refer patient to general medical adviser for treatment.

566. What for the third?

Alkaline treatment, systemically, as for sensitive dentine produced by acids. (See 190.)

567. What is *the* cause of periodontitis?

Irritation of peridentium, which, according to *amount* of irritation, temperament and physical condition, produces periodontitis of every grade of rapidity of induction, degree of severity, length of duration and extent of complication.

568. What are the five grades of periodontitis?

First Grade.—Such cases as present with merely marked soreness of tooth, quite prompt appearance of symptoms, decided restriction as to amount of tissue affected, and prompt resolution of inflammation and permanent cure upon either removal of cause or upon application of derivative or counter-irritant medication.

Second Grade.—Presents more marked soreness of tooth, less prompt appearance of symptoms, more extended tissue irritation, and resolution as deliberate as was the establishment of the disease upon accurate and somewhat persistent medication. This grade occurs in patients of high-grade temperamental attributes.

Third Grade.—Develops with sufficient celerity and presents excessive tenderness on pressure, not only upon the tooth, but upon adjoining teeth, surrounding parts and cheek; pronounced throbbing and great pain; general febrile excitement from systemic sympathy, as shown by flushed cheeks and quick pulse; imperative demand for relief, which should be promptly afforded with the *utmost* gentleness, using accurate counter-pressure if drilling vent; accuracy and thoroughness of either stimulant or

refrigerant medication, according to physical condition ; the precluding of irritation by appropriate guard, together with persistence in combating recurrence of trouble, is required.

Fourth Grade.—Diagnosed by the necessity of almost immediate abandonment of antiphlogistic treatment as useless, and the induction of suppuration by the systematic stopping and unstopping of the tooth if pulpless, or by the use of stimulating medications upon the gum, or both, as is most acceptable to the patient.

Fifth Grade.—Generally occurs in sanguo-nervous, bilio-nervous or lymphatico-nervous temperaments, or in nervo-sanguine if systemically adynamic. The various phases of violent acute inflammation rapidly succeed each other with increasing intensity, defying all antiphlogistic treatment, extending to adjoining teeth and inducing systemic sympathy. Immediate extraction of the affected tooth and persistent antiphlogistic treatment of the alveolar walls and adjoining teeth is indicated. Even this sometimes fails to save the adjoining teeth.

569. What are the seventeen recognized causes of periodontitis?

1. Want of occlusion.
2. Mal-occlusion.
3. Salivary calculus or tartar.
4. Looseness of tooth or root.
5. Induration of tooth tissue.
6. Cavity of decay impinging on the cementum.
7. Mechanical irritation.
8. Dental manipulation.
9. Excess of filling material.
10. Inflammation of pulp.
11. Excision of pulp without alleviating hemorrhage.
12. External irritation by forcible withdrawal of pulp.
13. Putrescent pulp.
14. Previous periodontitis.
15. Action of medicine locally.
16. Action of medicine systemically.
17. Action of virus.

570. How does want of occlusion cause periodontitis? Its remedy?

By efforts for exfoliation. Remedy—When practicable, establish occlusion.

571. What are the causes of mal-occlusion?

1st, natural or acquired irregularity ; 2d, change of position of teeth consequent upon extraction.

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572. What is the natural moving tendency of teeth in the mouth ?

The first bicuspid tend to remain stationary ; the teeth anterior to these tend to move backward and those posterior to move forward, as instanced by the tilting of a second molar upon the extraction of a first molar in middle life, or the annoying separation of the centrals upon extraction of a lateral, cuspid or the bicuspid.

573. How do salivary calculus and tartar cause periodontitis ?

By insinuating themselves beneath the free edge of the gum, thus irritating the pericementum.

574. What is taught of their removal ?

They should be thoroughly removed.

575. What is the remedy for periodontitis caused by undue leverage upon loose teeth or roots ?

1st, excising all or part of crown ; the remaining portion may comfortably sustain a clasp plate ; 2d, joining a loose tooth to a firm one by filling them together ; 3d, ligation with platinum or gold wire.

576. What is induration of tooth tissue ?

Hypercalcification of cementum, tending to produce ex-foliation.

577. What is its cause ?

Systemic influence.

578. What is its treatment ?

Nothing can be done ; extraction is the only relief for the periodontitis.

579. How do cavities of decay impinging upon the cementum cause periodontitis ?

1st, by retention of food, irritating from pressure and putrescence ; 2d, by presenting a roughened edge, which irritates the adjoining gum tissue.

580. What is the treatment of such cavities as are occupied by hypertrophied gum ?

Syringe cavity and gently insert one end of a loosely-rolled rope of cotton medicated with a soothing application ; fill cavity with the remainder of the rope, thus gradually pressing the gum from the cavity.

581. What are the mechanical causes of irritation?

The undue use of one side of a denture; the mastication of unduly-hard food; cracking of nuts or other abuse of like kind; blows upon the teeth or jaw producing contusion or fracture and periodontal irritation, ranging from slight irritation to that of violence sufficient to cause death of the pulp and even of the tooth itself; fractures in teeth involving the cementum.

582. What is the treatment of split teeth?

Draw parts together with ligatures; properly prepare pulp cavity and canals; fill the pulp chamber and cavity with zinc phosphate or amalgam in such manner as shall mechanically unite the parts; or platinum-band the crown, securing with plastics. In cases of split root, "ring-bolt." (See *Plastics and Plastic Fillings*, p. 138.)

583. When is "dental manipulation" a cause of periodontitis?

Whenever an operation, whether severe or even the gentle stopping of a tooth with cotton, is performed *contrary to indications*, "dental manipulation" is responsible for the resulting periodontitis.

584. In what four locations does excess of filling material cause periodontitis?

1st, on the articulating face, causing mal-occlusion; 2d, at the cervical edge of such cavities as impinge upon the cementum and interfere with gum tissue; 3d, in excess of contour, mesially or distally, maintaining a wedged condition; 4th, by protrusion through apical foramen or perforation.

585. How is excess on the articulating surface to be diagnosed?

By the sensation of the patient, the sight of the practitioner and the sound of the occluding teeth.

586. What is the sensation of the patient which indicates a second removal of excess?

The doubtful manner of "thinking" all to be right. If right, all hesitation will disappear.

587. How is occasional mal-occlusion during eating diagnosed to be due to excess of filling material?

With pumice remove the bright polish from the articulating face of the filling and allow to go for a few days; a bright spot

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on the face of the filling indicates the point of mal-occlusion. Impression-paper is also an efficacious adjunct; when placed between teeth and bitten upon it leaves a spot upon the filling, indicating excess.

588. What is taught of the relativity of amount of excess of filling material at the cervical edge and the degree of irritation induced?

They have no relation. All depends upon the susceptibility of the patient to irritation; therefore the slightest amount of excess should be carefully removed.

589. What is the remedy for excess in contour?

Filing off the contour until comfort is obtained.

590. What is the treatment for excess through apical foramen?

No cure can be effected unless the cause is removed.

591. In what manner does inflammation of a pulp cause periodontitis?

By extension of the inflammation outside of the apical foramen.

592. What is the one reliable diagnostic symptom?

The duplex character of the pain. To the tenderness upon pressure is added the paroxysmal pain of pulp irritation.

593. What is the treatment for this condition?

Soothe pulp, utilizing an existing cavity of decay, or removing filling, or making a pocket; follow this with devitalizing applications; in addition treat the periodontitis.

594. If devitalization does not give relief, what is to be done?

Attempt suppuration; if unsuccessful, drill through the alveolar process for vent; this failing, extraction is the only means for relief.

595. How many varieties of hemorrhage exist?

Red bleeding and white bleeding (effusions).

596. What should be done with hemorrhage having its source at the apex of a tooth?

It should be allowed free vent through the canals.

597. How may it cause periodontitis?

Through arrestation by styptic medication or by filling.

598. What is the proper treatment of the tooth?

When hemorrhage occurs, leave canals open, place absorbent cotton in the pulp cavity, and stop tooth temporarily.

599. How does forcible withdrawal of pulp cause periodontitis?

By retraction of tissue external to apical foramen.

600. How is this to be treated?

By applications of strong soothers, as eugenol, menthol, acetate of morphia paste, dental aconite or muriate of cocaine in canals; aconite and iodine to gum, with continuous applications of solution of bimeconate of morphia, fluid extract of piscidia or hamamelis upon the gum by means of pads.

601. What is the most frequent cause of periodontitis?

Putrescent pulp.

602. What is a necessary precedent of pulp putrescence?

Death of at least a portion of the pulp.

603. What is the first sign of a devitalized pulp?

A slight change of color and an opacity in the crown of the tooth ("clouding"), usually with gradual darkening.

604. What is the difference in the color produced by putrescent pulp and that produced by necrosis?

That from the former is bluish or grayish, while that from the latter tends toward the yellow or bronze-like color.

605. What time is usually required for putrescence of a devitalized pulp?

Usually from one to three years.

606. What is the shortest time known? The longest?

The shortest, one month. The longest, nine years.

607. May periodontitis be caused by the putrescence of less than an entire pulp?

Unextirpated portions of pulp, even in the finest canals, may produce severe trouble. In multirooted teeth a portion of pulp may be putrescent, while other portions are only dead or even vital.

608. What is the first indication in periodontitis from putrescent pulp?

The venting of the mephitic gas evolved.

609. How may this be done?

By drilling a vent hole either through the cavity of decay, or through a filling, or at the neck of the tooth, or in the position required for tap.

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610. What is a "vent-hole?"

An opening into the pulp cavity for the escape of mephitic gas.

611. How should a vent-hole be drilled?

With the least possible infliction, and in such a position as will not weaken the tooth, yet allow of free access to pulp canals.

612. Where are vent-holes usually drilled?

On the incisors and cuspids, disto-labially; on the first bicuspid, disto-buccally; on the second bicuspid, buccally; on the molars, mesio-buccally.

613. How is counter-pressure to be applied for relief from drilling?

By either the operator or the patient, by means of thumb or finger. When drilling presses the tooth into its socket, book-binders' thread may be knotted about the neck of the tooth, upon which the patient may exert the needed traction.

614. What should be done after drilling vent?

Pass probe into canals, loosen the putrescent material, and allow tooth to remain open a day or two, as indicated; on no account should it be immediately closed. (See 608.)

615. What time is required for relief after drilling vent?

Usually from five to fifteen minutes; sometimes several hours; occasionally no relief is given.

616. Why is previous periodontitis a cause of periodontitis?

The abnormal condition of peridentium left by previous periodontitis predisposes to a recurrence of the disease. (See 618.)

617. Under what circumstances is this likely to recur?

Tire of the peridentium from long-continued overwork, or adynamic, uterine, enteric or other systemic complications, especially in relation with pulpless teeth.

618. What is taught of the re-establishment of comparative normality in diseased tissue?

In proportion to the gravity of the disease is a return to comparative normality rendered less possible.

619. How is peridental irritation from sympathy with enteric disease to be diagnosed from enteric troubles caused by dental disease?

In the former the dental trouble is usually a *general tenderness*, concomitant with decided enteric difficulty; in the latter the

dental difficulty is *local* and of sufficient length of duration and severity of infliction to cause general enteric trouble.

620. What is taught of the treatment in each case?

1st, refer enteric trouble to general practitioner, and prescribe detergent and stimulant mouth-washes; 2d, remove the dental difficulty.

621. Name some of the other diseases of which peridental irritation may be symptomatic.

Most notably: measles, mumps, scarlet fever and diphtheria.

622. What medicine may produce periodontitis when applied locally?

Arsenic. (See 460.)

623. In what manner does phosphorus act?

It is not positively decided whether it acts locally or systemically; but local lesions are regarded as favoring its action.

624. What medicines may markedly produce periodontitis by systemic action?

Mercurials.

625. What are the signs and symptoms of mercurial salivation?

Marked soreness of the teeth; coppery taste in mouth; general peridental irritation, accompanied with considerable pain; swelling of the tongue; redness and subsequent whiteness of the gums; constant flow of saliva, and marked fetor of the breath.

626. What connection have mercurials with loss of teeth?

They destroy the peridentium, causing exfoliation, but have no effect upon the tooth-bone itself.

627. What are the marked differences between phosphor necrosis and mercurial necrosis?

Mercurials produce death of periosteum and bone, causing, sometimes, great deformity, while phosphorus acts only upon the bone, leaving the periosteum to restore the lost parts.

628. What three species of virus *may* produce periodontitis?

Miasmatic, syphilitic and typhoid.

629. What are the symptoms and signs of periodontitis in their order of inception?

Decided knowledge of the presence of the tooth; desire to work it with the fingers, tongue or antagonizing tooth; marked

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soreness; decided pain, together with throbbing of inflammation; violent pain upon tapping not only affected tooth, but perhaps adjoining teeth; elongation of tooth magnified to patient, with concomitant dull, persistent sense of *weight*, with *sometimes* fullness of tooth; continuous acute pain; redness of gums; usually complete obliteration of the health line.

630. What is the health line?

The line of demarkation between the pink and deep-red gum tissue.

631. Under what conditions may the health line remain unchanged?

Usually in connection with "pulsating pulps;" "nodular calcification;" "absorption of permanent roots;" "circumscribed or apical exostosis;" sometimes with apical necrosis; rarely in connection with *uncontrollable periodental irritation*.

632. What is the decisive symptom for periodental irritation?

Pain upon tapping and upon pressure.

633. Upon what does the proper treatment of any given case of periodontitis depend?

Upon an understanding of the grade of inflammation which is existent.

634. Into what two forms is periodontitis divided?

1st, acute, sthenic, circumscribed or phlegmonous; 2d, chronic, asthenic, diffused or erysipelatous.

635. Upon what do these depend?

Upon length of duration, violence of irritation, temperament and physical condition. High-grade sthenic patients of largely nervous, sanguine or bilious temperament usually have the acute form, while asthenic and adynamic patients of largely lymphatic temperament are more liable to the chronic form. Periodontitis lasting from one to seven days is acute; after this it is called chronic.

636. What is the division of the chronic form of periodontitis?

Benignant and malignant.

637. What are the two forms of general treatment in periodontitis?

Prophylactic or preventive, and curative.

638. What are the two forms of prophylactic treatment?

Local and general.

639. What is the local treatment?

1st, removal of cause of irritation; 2d, securing absolute rest of the parts by means of guards; 3d, application of tonic, astringent, stimulant, counter-irritant or sedative remedies, according to the indications.

640. What is the general or constitutional treatment?

1st, regulation of diet, rest and exercise; 2d, according to the severity of the case, the administration of a mild or drastic purgative for "derivation;" 3d, systemic sedation.

641. What are the restrictions as to diet, rest and exercise?

The diet should consist of food easy of mastication; rest should be taken in a semi-recumbent position; the exercise should be moderate in quantity, avoiding violent exertion.

642. What is the treatment for second-grade periodontitis?

Remove cause; apply guard for absolute rest of the tooth; dry gum and paint with dental aconite, protecting cheek by placing a wad of bibulous paper over the application; sometimes slight stimulation (capsicum) or support (iodine) if needed. (See 339.)

643. What is the treatment for third-grade periodontitis?

Remove cause with utmost gentleness; secure absolute rest by means of guards; apply persistently tonic, astringent, stimulant, counter-irritant or sedative local medication for resolution, together with local depletion, if indicated; constant use of cooling mouth-washes and constitutional treatment.

644. What are the various forms of guards?

The "gutta-percha," the "rubber dam," the "H," the "block" and the "filling" guards.

645. Describe the "gutta-percha" guard.

Warm gutta-percha base-plate; mold over lower teeth and secure a comfortable but not close occlusion upon the upper surface of guard; remove from mouth; slightly press so as to make guard "hug" the teeth; cool and apply. This form of guard is liable to be bitten in pieces by nervous patients.

646. Describe the "rubber-dam" guard.

Fold rubber dam several thicknesses, making a ribbon about an inch in length; pass coarse needle, threaded with book-binders'

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thread, through one side of one end, then through same side of other end, return through other side of other end, and other side of first end; place threads mesially and distally of selected tooth and draw close; tie buccally.

647. Describe the "H" guard.

Cut a piece of silver or tin plate into the form of an H and bend this into the form of a cap; puncture holes into the lingual ends and tie to tooth with book-binders' thread, to prevent loosening of appliance, with danger of swallowing.

648. Describe the "block" guard.

Take a piece of hard wood, one-eighth of an inch thick, three-eighths of an inch wide and about a half inch long, the ends rounded, and groove it on the upper surface near each end; drill two holes through it in each groove; take a four-tail ligature, made by tying two ligatures in the middle of each other; tie around tooth, leaving two ends extending lingually and two buccally; pass these through their respective holes in the guard and knot firmly in each groove. The groove prevents the knots from being bitten upon.

649. Describe the "filling" guards.

If practicable, "cold solder" an amalgam guard to a gold or amalgam filling upon the articulating face of a tooth, or build up a zinc phosphate filling upon the articulating face of *any* tooth.

650. Where should guards be placed?

Nearly all movable, tied and molded guards are to be placed on lower teeth, near the affected tooth, or occluding near it, if in the upper jaw. Filling guards may be placed on either side of the mouth, according to indications.

651. Name the means for local sedation by depletion.

1st, lancing as for extraction; 2d, the application of two or three good leeches over a slight cut made in the gum tissue adjacent to the inflamed part; 3d, gum cupping.

652. What medicines are to be applied upon the gum to *produce resolution* in cases of third-grade periodontitis?

As local sedatives: hamamelis, fluid extract of Jamaica dogwood, dental aconite; as astringents: tannin, tincture of krameria (applied by patient); as stimulant: capsicum bags; as counter-irritant: dental iodine in spots.

653. Name the medicines and remedies used in canals for the relief of severe periodontitis with open tooth.

Chloroform (in dry canals), or dental aconite (guarding against systemic effect), covered with cotton dipped in cloves (to prevent absorption by the cotton); acetate of morphia paste, with or without menthol or cocaine; or finely-pulverized nitrate of potassium, packed into the moderately-moist cavity (melts after several hours and is very cooling); electricity, and finally rapid drilling with small dental trephine or spear drill through the alveolar process into immediate proximity with the apex of the root.

654. For what purpose is drilling resorted to?

The release of effusions about the apex of the root.

655. What treatment should precede this?

The obtunding of the parts with repeated and careful applications of dental aconite or muriate of cocaine, or by the application of electricity.

656. What medicines are used constitutionally?

For wakefulness—Preparations of opium and morphia, syrup of lactucarium, hydrate of chloral, bromide of potassium in large doses, bromidia, Dover's powder. For sedation—Tartrate of antimony, squills or ipecac to slight nausea, tincture of veratrum viride, tincture of aconite root. For systemic irritability—Asafoetida, valerianate of ammonia.

657. What is the last resort upon failure of local and constitutional means to relieve periodontitis?

Produce suppuration by stimulation.

658. What is usually the first step in treatment after the cure of periodontitis from putrescent pulp?

Open up tooth; remove filaments of pulp with broaches or hooks, syringing frequently with tepid water; work glycerine into canals, washing out and reapplying as often as it discolors; pass alcohol into canals; dry and disinfect with oil of cloves, eugenol, solution of permanganate of potassium, solution of bichloride of mercury (1 to 1000) or peroxide of hydrogen; fill canals with fluid cosmoline or oil of cloves; dress with taper twists of cotton; fill tap with pellet of cotton or temporary stopping. (See 522.)

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659. What is taught of the permanence of this stopping, if introduced without sensation?

It is not permanent, but *must be removed for vent* of from five to fifteen minutes, if indicated by return of soreness.

660. How should teeth be treated which will not yield to the action of antiseptics?

By a systematic stopping and unstopping of the tooth.

661. How is this done?

Stop for six or eight hours; vent and restop for fifteen hours; vent and restop for twenty-four hours; vent and restop for forty-eight hours; vent and restop for seventy-two hours; then, if no soreness supervene, dress the canals.

662. How should teeth be treated which will not yield to systematic stopping and unstopping?

Drill apical vent, or establish fistula, or fill with "vent" (opening at neck of tooth).

663. What is the basal principle upon which the stopping of teeth depends?

The gradual but uninterrupted restoration to comparative normality of the tooth and surrounding parts; which, being open, have been and are yet in conditions of decided abnormality.

664. How is a tooth having a vital pulp left after the cure of periodontitis?

In a condition practically normal.

665. How is a tooth left after the cure of periodontitis from putrescent pulp or *protruding* filling material?

Pathological, because of its pulpless and open condition.

666. How is suppuration induced in fourth-grade periodontitis?

In sensitive patients make vent and sedate gum with mild medicaments, as hamamelis (use no strong sedatives, as aconite); when pain is endurable apply pepper bag; loosely stop the vent and unstop as the pain becomes unendurable; if liable to pain, unstop at night. The pepper bag should be removed during eating and sleeping. If stopping pains, owing to effusions, draw out effusions by absorbent cotton and restop. Medicate systemically. (See 656.) Cooling applications only are indicated for external medication. In less sensitive patients less frequent stopping and unstopping is required.

667. What complications render the chronic form of periodontitis more difficult of treatment?

Temperament (generally largely lymphatic) and adynamic, asthenic, systemic conditions, producing structural changes, effusions, tendency to caries and sanious pus.

668. What is the local treatment?

A mingling of stimulant (pepper bags for resolution), astringent (tannin) or sorbefacient (iodine) applications, according to the condition and recuperative energy of the patient. Place filling guard on opposite side of mouth, to allow tooth to do a little work; make soothing (cold water, vinegar and water, or hamamelis) or astringent (tannin and water, alum water) or sorbefacient (official iodide of potassium ointment) applications to outside of face.

669. What is the systemic treatment?

Good nutritious food; tonic medication; no purgatives.

670. What is the principle underlying the treatment of chronic periodontitis?

A deliberate restoration to normality, in view of previous deliberate and continued deviation.

671. What are the results of chronic periodontitis?

Watery effusions and indurations, either easy or difficult of discussion; œdema of lip and cheek; fetid breath; inspissated saliva.

672. What is the treatment for watery effusions?

R Tincture of arnica, }
Tincture of capsicum, } Equal parts.

Dilute sufficiently and apply on cloths to outside of face.

Or,

Iodide of potassium, \mathfrak{z} i.

Simple Ointment, \mathfrak{z} i.

Liquor of potassa, gtt. iii.

Rub on outside of face, about the part affected.

673. What is the treatment for indurations?

Dental iodide of potassium ointment, applied two or three times a day.

674. What is the treatment for the fetid condition of the mouth?

Eau de cologne, 1 part.

Alcohol, 3 parts.

One-half teaspoonful to glass of water as mouth-wash.

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675. What is the treatment if resolution be impracticable?

Produce suppuration by stimulating continuously all patient can comfortably bear.

676. What is the time required to produce suppuration in these cases?

From four to seven days—perhaps longer.

677. What form of disease is established by the termination of periodontitis in suppuration?

Alveolar abscess?

678. What is the line of distinction between periodontitis and alveolar abscess?

As soon as the least pus is formed periodontitis ends and alveolar abscess begins.

ALVEOLAR ABSCESS.

679. What is an alveolar abscess?

A cavity containing pus, having its incipency between the external and internal alveolar plates.

680. What are the six causes for alveolar abscess?

1st, putrescent pulp; 2d, tartar; 3d, a necrosed tooth or root; 4th, carious bone; 5th, necrosed bone; 6th, foreign materials (splinters, bristles, filling material protruding through apical foramen, or perforation, broken probes, etc.).

681. How is a tooth having a vital pulp left after the cure of alveolar abscess?

In such a condition as permits a *natural* return to comparative normality.

682. How is a tooth left after the cure of alveolar abscess from putrescent pulp or protruding filling material?

In such a condition as, by *subsequent treatment*, may permit a return to comparative normality.

683. What is the usual location of an abscess from putrescent pulp?

At the apex of root of the tooth. In multirooted teeth sometimes found in the bifurcation or between the roots.

684. What are the two kinds of alveolar abscess?

Acute and chronic.

685. To what do the terms acute and chronic refer?

To length of duration. (See 86.)

686. What are the local signs and symptoms of acute alveolar abscess?

Violent throbbing pain, redness, heat, tension and swelling, with subsequent fluctuation, lasting from ten hours to three or four days, until the evacuation of pus, when only swelling remains. If from putrescent pulp, sense of fullness in the tooth.

687. What are the general signs and symptoms of acute alveolar abscess?

Fever, with accompanying hot, dry skin, coated tongue, constipation, prostration, violent pain shooting through neck and face.

688. What are the signs and symptoms of chronic alveolar abscess?

A change in character or long continuance of the acute; or from the first less violent but more extended manifestations; pain usually less violent, but more enervating; discoloration more diffused; œdema more extended; tendency of pus to infiltrate into surrounding tissues, especially in persons of strumous diathesis; gradual cessation of these signs and symptoms upon establishment of fistula.

689. In what ways may an abscess discharge its pus?

1st, through the external or internal alveolar plate and covering tissues into the mouth, usually distally from affected root; 2d, through the apical foramen, canal and crown of tooth; 3d, at free edge of gum, between root of tooth and surrounding process; 4th, through antrum and meatus into nostril on side of lesion; 5th, from upper jaw, internally into pharynx or externally through cheek; 6th, from lower jaw, externally, either facially or cervically.

690. What is the prognosis as regards saving of tooth in connection with single-rooted teeth?

Usually favorable, excepting occasionally upper laterals and more frequently lower bicuspid.

691. What is the prognosis in connection with multirooted teeth?

Usually favorable, excepting lower third molars and teeth with external fistulæ.

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692. What are the possible sequelæ of alveolar abscess?

Continuous suppuration, indurations, growths, necrosis of portion of maxilla, facial neuralgia, otalgia, cophosis, ophthalmalgia, amaurosis, cephalalgia and even pyæmia and tetanus.

693. What are the two forms of treatment of alveolar abscess?

Palliative and curative.

694. What is the palliative treatment?

The promotion of free suppuration, the induction of pointing and the establishment of a fistula in the manner most acceptable to the patient. (See 666.)

695. What are the means of curative treatment?

1st, treatment of tooth, either with or without a fistulous opening; 2d, extraction of tooth or root if not valuable or the disease be otherwise incurable.

696. What is the difference in treatment of abscess from putrescent pulp with fistulous opening and without?

With a fistulous opening.—Effect free entrance; thoroughly cleanse and disinfect canals (see 658), not forcing medication through apical foramen; dress roots permanently and fill tooth; allow several weeks for natural healing of fistula. If this does not occur, inject with detergents, astringents or stimulants, as indicated:

Salt and water.

Solution of chloride of zinc
(zinc, 5 grs.; water, 1 oz.).

Phénol sodique.

Solution of sulphate of zinc
(zinc, 5 grs.; water, 1 oz.).

Solution of alum (saturated).

Tincture of calendula.

Solution of Calvert's carbolic
acid (acid, 20 to 60 grs.;
water, 1 oz.).

Iodide of zinc (deliquesced).

Dilute sulphuric acid (acid, 1
part; water, 3 parts).

Without fistulous opening.—Open tooth; cleanse canals; evacuate pus through canal if possible; disinfect tooth; leave open or loosely stopped from one to three days, in view of continued pus formation; this will determine whether the vent is a sufficient relief for the abscess. If symptoms do not return, disinfect canal again and proceed as in periodontitis from putrescent pulp, either by the antiseptic method or by the systematic stopping and unstopping of the tooth, recognizing the additional concomitant of irritation from the presence of pus. If symptoms of abscess return after leaving tooth open, a fistula must be established.

697. What are the three methods of establishing a fistula?

1st, by closing canals and stimulating to suppuration (see 666); 2d, by lancing through the tissue; 3d, by drilling through alveolar process to apex of root. (See 653-655.)

698. What is the method of ascertaining upon which root of a multirooted tooth an abscess is located?

Pressure upon the crown in the direction of the root affected will usually produce greater response than pressure in other directions.

699. What is taught regarding the diagnosis of abscess in the bifurcation of roots?

This most frequently pertains to lower molars. Its diagnosis is only inferential, based upon continued pus formation and apparent inability to reach seat of disease by free canal openings.

700. What is the treatment?

Drilling through the cementum from the pulp cavity directly upon the abscess.

701. What is the last resort?

Extraction.

702. Name the medicaments recommended for introduction into canals as permanent dressing in cases of abscess.

Acetate of morphia paste, with or without menthol, oil of cloves, eugenol, oils of cajeput and eucalyptus, fluid or viscid cosmoline, inspissated canal dressing, or, as a last resort, iodoform paste.

703. What is the treatment for abscess in the upper jaw, with external fistula?

Establish internal fistula and subsequently either treat or remove the tooth or root.

704. What is the treatment for abscess in the lower jaw, with external pointing?

Lance freely and evacuate the pus through the gum tissue, even though the abscess be ready to discharge externally; support externally with bandage and compress, using the latter as a means for cooling applications; stimulate internally until an internal fistula is established; then extract the tooth.

705. What is the danger in cases of abscess in the lower jaw, with external fistula?

Unightly scar, which is *always* consequent upon the extraction of the tooth prior to the establishment of an internal fistula.

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706. What is the method of preventing unsightly scar in such places as would be plainly visible in females and beardless males?

Thoroughly establish a new fistula beneath the rim of the jaw by drawing up the tissues, puncturing them and drawing a seton through from the old fistula to the new one; this seton should be gradually withdrawn through the new fistula as the old fistula heals; after new fistula is thoroughly established and old fistula is thoroughly healed, extract tooth.

707. What subsequent precaution should be observed in cases with external fistulæ successfully treated without removal of tooth?

To extract tooth upon the slightest recurrence of peridental irritation.

708. What is the treatment after extraction for alveolar abscess?

If the sac be removed with the tooth, only that treatment is needed which will insure the closing of the alveolus; but if not removed, obliterate the sac with hoe-shaped excavator.

CARIES AND NECROSIS.

709. How is the diagnosis of carious bone made?

By means of a chisel-pointed probe. A soft, honey-combed condition is found.

710. What is the treatment?

Remove the carious bone.

711. How is necrosis of alveolar process diagnosed?

By peculiar feel of hardness and smoothness under instrument and the marked bluish, glazed appearance of the gum.

712. How does caries of the walls of an alveolus sometimes occur?

Through lack of covering by granulations.

713. What is the treatment?

Bur out the process till a surface capable of healthy granulation is reached. Strengthen clot by astringent applications.

714. What lesions may a dead tooth occasion?

An almost endless variety of local, facial, antral, nasal, ophthalmic, otic, cerebral, muscular and even systemic complications. (See 429.)

715. How is the diagnosis of a portion of root within the alveolus made?

With the instrument used for diagnosing carious bone. A characteristic sound and feel is produced upon scratching and touching.

PYORRHŒA ALVEOLARIS.

716. What is pyorrhœa alveolaris?

A more or less general formation of pus about the roots of the teeth exuding from beneath the free edges of the gums.

717. What is its cause?

Systemic predisposition, combined with decided induration of tooth tissue or other local irritant (sanguinary calculus, caries or necrosis of process edge, gum pouches).

718. What is its treatment?

If possible, thorough removal of all local possibilities for irritation, together with astringent, detergent and stimulant medication (zinc chloride, zinc iodide, carbolic acid and caustic potassa, dilute sulphuric acid, peroxide of hydrogen).

719. What is the prognosis?

Possible amelioration of greater or less length of duration; *probable* recurrence of trouble, with usually gradual but persistent re-establishment of previous condition.

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MEDICAMENTS.

Aconite Root, Tincture of.—(Officinal.) Systemic dose, three to five drops. Sedating to the nervous system.

Aconite, Dental Tincture of.—(Four times strength of officinal.)

R Tincture of aconite root, $\bar{\text{z}}$ i.

Place in wide-mouthed bottle; mark bottle one-fourth way up; evaporate to mark. Systemic dose, *one drop*.

USES.—Powerful sedative and pain obtundent; used with acetate of morphia when needed; is a local anæsthetic. Very great care must be observed in its use.

Aconite, Laudanum and Chloroform.—See Laudanum.

Aconitia Ointment.—*Avoid mouth and eyes.*

R Aconitia, gr. ii.
Simple cerate, $\bar{\text{z}}$ i.

Mix with spatula on druggist's slab, thus: Rub up the aconitia with a small portion of cerate; soften with three or four drops of oil of cloves; add the balance of the cerate, a little at a time; spatulate briskly and thoroughly for twenty minutes.

USES.—Applied externally for relieving stiffness of jaws, neuralgic trouble, soreness of throat; rubbed *on the skin* over the part affected. A drop of oil of cloves softens the ointment for application, if needed. Apply from tip of little finger for gentleness. (Powerful poison.)

Alcohol, 95 Per Cent.—(Not Druggists'.)

USES.—Cleanser for canals and cavities; deodorizer; *drier* for cavities; for making solutions and for burning.

Alum.

USES.—Saturated solution for syringing abscesses; weaker solution for astringent mouth-wash in edentulous mouths.

Ammonium, Carbonate of.—In quarter-grain doses is used in systemic treatment for sensitive dentine.

Antimony and Potassium, Tartrate of.—See Tartrate.

Arnica, Tincture of.—Combined with water, one-half teaspoonful to glass of water, is especially indicated in cases of soreness from swelling; may be used in the mouth.

Arnica and Laudanum.—See Laudanum.

Arsenical Pastes.

R Arsenious oxide, gr. v.

Acetate of morphia, gr. x.

Mull in mortar; moisten cotton pellet in either oil of cloves, eugenol, oily carbolic acid or dental aconite, and dip into powder.

R Arsenious oxide, gr. v.

Acetate of morphia, gr. x.

Either oil of cloves, eugenol, oily carbolic acid or dental aconite, gtt. x.

These separate on standing, as follows:

Carbolic acid, cloves, etc., . . . top layer.

Acetate of morphia, . . . middle layer.

Arsenious oxide, . . . bottom layer.

Therefore must stir paste before using.

R Arsenious oxide, gr. v.

Acetate of morphia, gr. x.

Viscid cosmoline, q. s., to buttery paste.

Does not separate.

R Arsenious oxide,
Acetate of morphia, } āā. gr. v.
Muriate of cocaine,
Oil of cloves, q. s., to paste.

Arsenical Devitalizing Fibre.

R Absorbent cotton (cross-cut fine).

Arsenious oxide, gr. v.

Acetate of morphia, gr. x.

Oily carbolic acid, q. s., to very thin paste;
saturate cotton with paste and dry.

Used in places where pastes would be dangerous from leakage.

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Asafoetida.—Pills of two grains each. Used as internal stimulant when suffering, or in nervousness or irritability from loss of sleep; in weakness and faintness; useful for reduction of sensitivity.

Benzoin, Tincture of.—Pulp soother; leaves gummy residuum at bottom of cavity; used instead of sandarac for gumming cottons in cases of pulpitis; useful in mouth-washes, given after extraction; used in soaps and in making benzoated cerate.

Benzoated Cerate.

R Simple cerate, $\bar{3}$ i.

Tincture benzoin, $\bar{5}$ i.

Used in making the red precipitate ointment; prevents spoiling.

Cajeput and Eucalyptus.

Oil of cajeput, } Alternates.
Oil of eucalyptus, }

Antiseptics and pain obtundents; used in canals and in devitalizing pulps of deciduous teeth.

Calendula, Tincture of.—Excellent stimulant to recuperation; a few drops in a half tumbler of water excellent as collutorium.

Camphor, Spirits of.—Preferred by some persons to cologne; also useful in pulpitis.

Capsicum, Tincture of.—Stimulant; painted on gums; diluted according to the ability of patient to endure; does not vesicate; diluted, makes a good stimulating injection.

Capsicum Bags ("Pepper Bags").—Made by sewing a thickness of muslin ($\frac{3}{4}$ in. x $\frac{3}{8}$ in.) and of thin rubber cloth together on three sides, filling with ground capsicum or ground capsicum and ground ginger (equal parts), and sewing up the fourth side. Useful for resolving incipient periodontitis (see 99), stimulating to suppuration when indicated, and hastening ulceration in alveolar abscess.

DIRECTIONS FOR USE.—Before applying the pepper bag it should be soaked a few minutes in water—five or ten—when

it should be placed upon the gum over the sore tooth, with the muslin side against the gum and the rubber cloth against the cheek.

This prevents the pepper from too severely irritating the cheek, and secures increased irritation at the place where it is desired.

It sometimes happens that the "burning" of the pepper bag is too intense, even with the precaution of the soaking. Should this be, it will be rendered more tolerable by removing the bag, washing it off in cool water, and rinsing out the mouth, and then replacing the bag. It is sometimes necessary to repeat this washing and rinsing operation two or three times, but this is very unusual.

When the pepper bag has been made acceptable, it should be worn *constantly*, except while eating or sleeping.

After it has been worn for some days, and, indeed, when it has apparently lost *all* its strength, *it must not be regarded as worthless, for it is then in the very best condition to produce excellent results.*

If these seemingly worthless pepper bags were dried and then tested with the tongue, they would be recognized as possessing quite enough taste of capsicum to insure sufficient irritation for all practical purposes.

It is, therefore, only very exceptionally needful to use more than one pepper bag in any given case.

Carbolic Acid, Calvert's (crystals).—Used when solubility of the acid is desired; in solution is an excellent stimulant injection for fistulæ. (See 696.)

Carbolic Acid, Oily ("Merck's Creasote").—Darkens in color with age, but not spoiled; obtundent of sensitive dentine; obtundent in pulpitis; escharotic; antiseptic; never to be used in canals or as obtundent in deep-seated caries, unless devitalizing; used for saturating crown dentine in pulpless teeth of very poor structure; used for carbolic acid soap.

Cerate, Benzoated.—See Benzoated.

Cerate, Simple.

R Lard, 2 parts.

White wax, 1 part.

Keep in porcelain jar. Used for making ointments and anointing stoppers.

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Chalk, Prepared.—(The same article as precipitated chalk, but in lump form.) Is alkaline; used for sensitive dentine; the lump form prevents its being blown away by breath; neutralizes the acids used for sensitive dentine; also acids of mouth (see 172); its daily judicious use reduces sensitivity of dentine.

Chenopodium Album, Tincture of.—(Not officinal.) Styptic and hæmostatic for light-haired patients.

R Leaves of chenopodium album (lambsquarters).
95 per cent. alcohol, q. s.

Gather leaves when flowers are in bud.

Dose.—For active hemorrhage—One drop each minute in teaspoonful of water for five to forty-five minutes. For hemorrhagic oozing—Two or three drops every five or fifteen minutes, as indicated. As preventive to hemorrhage in hemorrhagic diathesis—Three to five drops three to five times a day for a week.

Chloral Hydrate.

R Hydrate of chloral, ʒiii.
Water, ʒi.

Used after tannin No. 2 as pain obtundent; use with care; irritating to mucous membrane and epithelium.

Chloroform.—Local or general anæsthetic, and justly accorded to be the most dangerous.

Cinnamon, Oil of (Chinese).—Alternate to oil of cloves.

Cloves, Oil of.—Pain obtundent, stimulant, antiseptic and odorizer. Used for moderately persistent obtunding of sensitive dentine; soothing of pulp; for canal dressings; to prevent soreness of gum in separating teeth and in pelleting ingrowing gum; ingredient in pastes and sandarac varnish.

Cocaine, Muriate of (crystals).—Used in sensitive dentine; with acetate of morphia paste: as pain obtundent; as local anæsthetic.

Cologne, Eau de.—(Should contain little or no rosemary, which is bitter.) Used as stimulant in cases of faintness or weakness; as odorizer for mouth in putrescent pulp, tartar and extracting cases; also odorizer for office.

Cosmoline, Fluid.—Emollient; permanent antiseptic. Used as a vehicle in pastes; is a valuable canal medicament; is usually combined with menthol.

Cosmoline, Viscid.—Useful as permanent canal dressing.

Erigeron Canadense, Tincture of (Fleabane).—Styptic and hæmostatic for dark-haired patients.

R Erigeron Canadense (leaves).

95 per cent. alcohol, q. s.

Uses and doses same as of chenopodium album.

Eucalyptus.—See Cajeput.

Eugenol.—The active principle of the oil of cloves. Very powerful pain obtundent.

Glycerine.—Used in canals; antiseptic and detergent; is not durable, because of solubility; absorbs water from dentine; soothes pain from carbolic acid; solvent in making medicaments.

Hamamelis.—Pond's or Humphrey's Extract of Hamamelis Virginica (Witch Hazel). Reliable antiphlogistic; useful in periodontal trouble; to be used by patients diluted; a teaspoonful to a half tumbler of water; or full strength on pads over gum; or for syringing fistulæ; or for œdematous conditions externally; especially adapted to irritation of mucous membranes.

Hop Pillow.—(Dry hops in small pillow-case.) Useful as systemic soother.

Hop Poultice.—(Hops moistened with hot water, made of convenient size and applied for neuralgia or other facial complication.) *The only hot external application* which is ever permissible in cases of alveolar abscess.

Hops, Strong Infusion of.—Soothing external application.

Hypodermic Injection.—See Morphia.

Inspissated Canal Dressing.

R Acetate of morphia, gr. x.

Sulphite of lime, gr. x.

Fluid cosmoline, q. s., to a thick paste.

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Iodol Paste - V.H.

Iodol

grs X

Zinc Oxide

grs XX

Carmoline Carbolyzed

g. s.

to form a ~~thick~~ paste - mas at.

140 7.14.

The portion used is softened with a crystal of menthol (for cooling). In canals is soothing, antiseptic, unchangeable and easy of removal in case of future trouble.

Iodine, Dental Tincture of.

R Iodine, \mathfrak{z} iii.
Alcohol, \mathfrak{z} i.

Dissolve iodine by frequent daily shaking for a week or two. Used on gums as counter-irritant after capping, or in periodontitis; also acts as sorbefacient; is used in devitalization of deciduous pulps. Use in small quantity with great care.

Iodoform Paste.

R Iodoform crystals, gr. xx.
Fluid cosmoline, gtt. x.
Oil of cinnamon, gtt. ss.

Used as last resort in pulp soothing or capping, or in canals.

Ipecacuanha, Syrup of.—Systemic sedative. Use same as of tartrate of antimony or lobelia.

DOSE.—Two or three drops every half hour, *ad nauseam*.

Krameria, Tincture of.—Used for its astringent and coloring qualities in mouth-washes.

Lactucarium, Syrup of.—(Should be well made.) Produces natural rest, if not sleep, by quieting the nervous system.

DOSE.—A teaspoonful to a dessertspoonful every half hour, if needed.

Laudanum.—Pulp soother; antiphlogistic. Used in combination with arnica in mild periodontitis; narcotic when taken internally. Systemic dose, twenty to twenty-five drops.

Laudanum, Aconite and Chloroform.

R Laudanum,
Tincture of aconite (officinal), } Equal parts.
Chloroform,

Used as a substitute for aconitia ointment, especially in cases of neuralgic trouble from pathological eruption of lower wisdoms.

Laudanum and Arnica.

R Tincture of arnica, } Equal parts.
 Laudanum, }

Or,

R Tincture of arnica, } Equal parts.
 Bimeconate of morphia, }

Are alternates. Used in cases of mild peridental trouble, on muslin pads, over affected tooth. May swallow the saliva.

Lead Water and Laudanum.

R Acetate of lead, ʒi.
 Laudanum, ʒi.
 Water, Oi.

Antiphlogistic for external application.

Lime Water.—Place a lump of unslacked lime in a bottle of water, making a saturated solution. Useful in sensitive dentine, both locally and systemically. As solution is used, add more water indefinitely.

Lobelia, Tincture of.—Alternate to tartrate of antimony.

DOSE.—Two or three drops every three or four hours, to slight nausea.

Menthol (crystals).—Cooling; soothing. Used with acetate of morphia paste or inspissated canal dressing, or other medicaments, when its qualities are needed. It softens the paste. Mixed with paraffine or spermaceti, is used *ad libitum* for soreness of jaw and neuralgia.

Mercury, Bichloride of.—(Diluted, 1 to 1000.)—Is an excellent disinfectant for canals. Use with care. Has disagreeable taste.

Morphia, Acetate of.—Used in acetate of morphia paste; in arsenical paste; in inspissated canal dressing.

Morphia, Bimeconate of (Solution).—(Solution of same strength as laudanum.) A good make will remain clear; alternates with opium and morphia administrations, being especially indicated in nervo-bilious and bilio-nervous temperaments.

DOSE.—A half teaspoonful, *pro re natâ*.

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Morphia, Hypodermic Injection of.—For sensitive dentine. Dissolve in water hypodermic pellet containing sulphate of morphia, $\frac{1}{2}$ gr.; sulphate of atropia, $\frac{1}{120}$ gr., and inject into arm.

Morphia Paste, Acetate of.

R Acetate of morphia.

Oil of cloves, q. s., to make paste.

Pain obtundent. A portion of this is used alone or with menthol (a crystal or two), or with cocaine (a small portion), or a part of a drop of dental aconite, as indicated; also used for pulp puncture.

Nitric Acid, 41°.—Used for obtunding sensitive dentine and for canker sores. Napkin mouth and dry canker sore; touch sore with nitric acid on pointed stick till entirely white; causes pain; obtunded by oil of cloves on pellet of cotton, previously prepared.

Pepper Bags.—See Capsicum Bags.

Peroxide of Hydrogen.—Used for the treatment of pus-making surfaces; for disinfecting canals; for treating canker sores in the mouths of children.

Phénol Sodique (Hance Bros. & White's).—Very acceptable and efficacious medicament. Pain obtundent, styptic, detergent, antiseptic, disinfectant, stimulant; is a useful injection for fistulæ; useful as a mouth-wash; ten to thirty drops to half tumbler of water.

Piscidia Erythrina, Fluid Extract of (Jamaica Dogwood).—Used in difficult devitalization in canals; is notable pain obtundent; sedative; applied locally and administered systemically, is eminently antineuralgic. Systemic dose, one-half teaspoonful, *pro re natâ*.

Potash, Chlorate of.—Make saturated solution in water. Used (either full strength or diluted, as is agreeable) to hold in the mouth in cases of peridental trouble and sore mouth generally; should be occasionally swallowed for the systemic effect.

Potassa, Caustic (in sticks).

R Caustic potassa,
Carbolic acid (crystal), } Equal parts. (Robinson's remedy.)

Rub together. Used for sensitive dentine and in pyorrhœa alveolaris.

Potassium, Bromide of.—When given for the relief of dental suffering, should administer at least forty grains, and more if the patient is accustomed to its use, administer in water.

Potassium, Carbonate of.—Fill small bottle half or three-quarters full; add glycerine; rub up in mortar; return to bottle; add glycerine as used. Used in sensitive dentine; especially indicated in the variety about necks of teeth; does not injure mucous membrane.

Potassium, Nitrate of.—Eminently cooling. Used in pulp cavity in severe periodontitis. (See 653.)

Potassium Ointment, Iodide of.

R Iodide of potassium, ℥i.
Simple cerate, ℥i.

Add one drop of liquor potassa to prevent discoloration. If ointment crystallizes, spatulate before using. Used for indurations or slowness of absorption.

Potassium, Permanganate of.—Used in strong solution for disinfecting canals; in mild solution for sweetening the breath.

Quinia, Sulphate of.—Antiperiodic; usually an excellent remedy in neuralgia, but clinical experience seems to show that it is contra-indicated in dental neuralgia.

Red Precipitate Ointment.

R Red oxide of mercury, gr. lxii.
Benzoated cerate, ℥ii.

Is a good lip salve; relieves rough, scaly and cracked lips. Application—Open crack and rub ointment in; do this for several visits, until strong cicatricial tissue is formed.

Salt and Water.—(Strength of ocean water.)—Excellent stimulant and detergent in inflammation of the mucous membrane; also useful injection for fistulæ.

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Sandarac Varnish.

R Oil of cinnamon, ʒss.
Oil of cloves, ʒss.
Alcohol, ʒi.
Gum sandarac, q. s.

Used to saturate cottons, and thus render them more subservient to the varied requirements of maintenance in position, exclusion of moisture and retention of medicaments.

Smelling Salts.

R Muriate of ammonia, }
Bicarbonate of soda, } Equal parts.
Oil of cloves, a few drops.

Place simple cerate around the glass stopper of the bottle.

Soda, Bicarbonate of.—(Ordinary baking soda.) Used in sensitive dentine, and for systemic hyperacidity. (See 190.)

Styptic Cotton.

R Monsel's solution, 2 parts.
Water, 1 part.

Steep absorbent cotton in the mixture and dry. Used as adjunct in cases of hemorrhage requiring mechanical retention of the clot.

Sulphuric Acid, Dilute.

R Sulphuric acid, 1 part.
Water, 3 parts.

As a stimulant injection, seems especially indicated in connection with cases of caries and necrosis.

Sulphuric Acid, Aromatic.

USES.—Same as of the dilute.

Tannin.—Astringent and styptic. Used after extraction in cases of hemorrhage or insufficient clotting; also used in combination with glycerine as obtundent in sensitive dentine.

Tannin and Water.—Useful as astringent for external use; to be applied on cloths.

Tannin No. 1.

R Tannin, \mathfrak{z} i.
Glycerine, \mathfrak{z} i.

Mix in a mortar with gentle heat. Obtundent of sensitive dentine.

Tannin No. 2.

R Tannin, \mathfrak{z} ii.
Glycerine, \mathfrak{z} i.

More powerful obtundent than No. 1.

Tartrate of Antimony and Potassium (Tartar Emetic).

—Produces vital depression, and thereby systemic sedation.

DOSE.—One grain every three or four hours to slight nausea. Always inquire of patient as to usual effect of this drug.

Temporary Stopping.

R White wax, 1 dwt. (full).
Red gutta-percha base-plate, 4 dwt.
Precipitated chalk, 4 dwt.

Melt wax first; add gutta-percha, and melt thoroughly; then add chalk in small quantities, thoroughly incorporating it with the gutta-percha; partially cool and roll into sticks with hands, and afterwards with a plate of glass. Is non-leaking. Used for covering canal medicaments and arsenical applications; for filling bulbous portion of pulp cavity; as intermediate.

Veratria Ointment.—*Avoid with utmost care the mouth and eyes.*

R Veratria, gr. xx.
Simple cerate, \mathfrak{z} i.

USES.—To be used on failure of aconitia ointment to act, or to increase the action of aconitia; is never used before aconitia. It produces a decided, persistent, irritating or burning sensation analogous to nettle. Use in pieces the size of a quarter of a pea. (Powerful poison.)

Veratrum Viride, Tincture of.—Give by pulse. Administer two or three drops and wait several hours; then reduce pulse by drop doses, and keep reduced by one drop each two or three hours.

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Vinegar and Water.—Excellent antiphlogistic for external use; to be applied on cloths.

Zinc, Chloride of.—Deliquesce crystals in a saucer, and pour off supernatant liquid for use; keep in glass-stoppered bottle. Used in sensitive dentine and as *dernier ressort* in canals for devitalization; is used for injection of fistulæ in solutions of varying strengths, from powerfully stimulant to mildly detergent.

Zinc, Iodide of.—(Full strength.) Stimulant injection.

Zinc, Sulphate of.—Stimulant injection. (See 696.)

